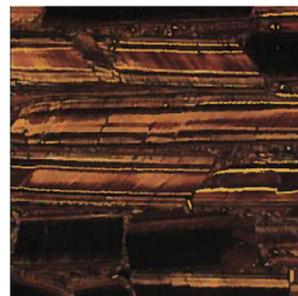
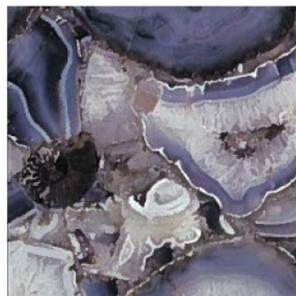
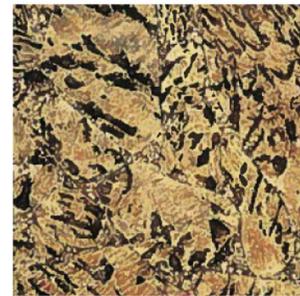
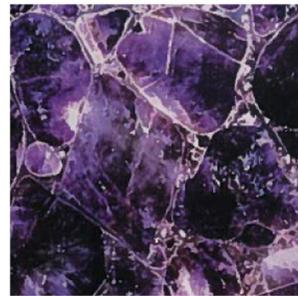
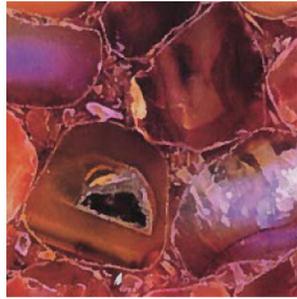


The Jewel of the City
Susan Movassagh



Washington - Alexandria Architecture Center

The Jewel of the City

Susan Movassagh

Thesis submitted to the faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Master of Architecture
in
Architecture and Urban Studies

Paul Emmons
Jaan Holt
Marcia Feuerstein
James Ritter

03.15.2011
College of Architecture and Urban Studies
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The Jewel of the City

Susan Movassagh

abstract

This thesis topic was selected in order to explore a connection between a passion for the beauty of gemstones and craftsmanship of jewelry making to provide a metaphor for making beautiful architecture. The direction of the thesis made manifest connections and similarities between integrating art, craft and making beautiful jewel pieces and architectural spaces for a building devoted to housing the kinds of precious items that would be reflected in a city such as Washington DC. The appreciation of outstanding factors in gems and jewel making would be analogous to the precision, design and level of detail explored in an architectural thesis which aims to celebrate these relationships by applying them to the design for a museum of jewels and gemstones for Rock Creek Park in Washington DC.

acknowledgements

Thanks to my committee members;

Jaan for providing me the opportunity be an integral part of the WAAC family.

Marcia for helping me question both what I want to achieve and what the thesis project wants to be.

Jim for entrusting in me with the following words at midterm, 'If you continue with the same care as you have, you too will have beautiful project ahead.'

Most of all, Paul, thank you for inspiring and guiding me from the very beginning of my WAAC experience. With your encouragement and support, the thesis project developed like a magnificent gemstone formed over time.

To my father

Thank you for the foundation and support to help me achieve my dreams on a journey to make architecture.

To George

Who through his guidance and support discovered with me a love of Architecture at WAAC.

To my family and friends

Special thanks to all who contributed to make this thesis a wonderful and enjoyable experience. Without you this work would not have been possible.

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project narrative

An architectural gemstone provides the subject as an intricately cut and considerably placed item on an urban setting in Rock Creek Park regarded as the Emerald of the City.

The intent of this project is not just to appreciate the beauty of the collection that is exhibited, but to allow visitors the opportunity to see and physically experience the refinement and craft that has been applied to almost every architectural element of this project.

As it is required for every major or minor part of a jewel to be cut, polished, formed, and mounted to complete a significant piece, I mined these ideas for architecture that resembles the same care with a strong relationship of craft in making architecture.

The project as a whole includes a museum and pedestrian bridge placed in this unique site of dramatic elevation variation. The building is an illuminated display case with a colorful glow, which houses one of the finest collections of treasures around the world including precious items such as gemstones, crystals, minerals, rocks, and jewelry accompanied with demonstration labs, workshops and classrooms.

The significant architectural elements of this project are listed below which are sculpted or faceted as gemstones would, in order to make one piece of jewel for the city of Washington D.C. in the heart of nature.

- sculpted and faceted main entry
- central void
- faceted glass skylight above the void
- three types of staircase; spiral around a central void space, display case, and exterior stairs
- two elevators
- alabaster wall
- angled steel columns
- concrete piers
- exhibits; square display cases, exhibit rooms between the main building piers, cave with display cases built in the rock wall
- illuminated glass pedestrian bridge floating in the valley connecting the two roads
- foot bridge at the bottom level of the exterior stair connecting the building to the pedestrian trail in the valley
- exterior glass walls, transparent and translucent

The overall program of the building includes lobby, gift shop, exhibits, workshops, classrooms, and oyster and champagne bar.

There are two different types of experiences once a visitor arrives to the site. First, when the museum is open, the visitor may choose to enter the building. Second, when the museum is closed, a pedestrian may pass through the site via the exterior stairs accessing the park hiking trail or cross the bridge spanning the site valley.

Interior Journey

Arriving from Rock Creek Drive, a visitor first sees a glass stairwell like a display case exhibiting people ascending or descending through the building. This display has three glass walls allowing direct southern sunlight to penetrate through a fourth wall of alabaster into the main building space. This fourth feature stone wall is continuous and sends a glow through all seven levels of the building.

At arrival the other immediate visual element of the building is the main entry of the museum where a visitor enters the building through a sculpted and faceted glass wall. Once inside, the visitor can take an elevator all the way down to the lowest level -3 to begin the journey. The building levels are organized based on the phases of gemstone refinement starting from the lowest level excavation -3, cut -2, grind -1, ground/street/lobby 0, facet +1, finish +2, and mount +3. Each level would display the pieces of the relative phase of gemstone refinement.

Throughout the museum there are various types of display cases exhibiting gemstones, crystals, minerals demonstrating their diverse colors with a special effect of light and settings. There are also collections of geographic maps to represent the native environments where gems and jewels have originated. The building contains a working gem cutting lapidary and gold/silver workshop, as well as educational facilities.

The two elevators have two various material characteristics as they travel up or down. For the three levels below the street level that belong to earth they have solid enclosure and are dark. For the ground and three levels above, these elevators have a glass enclosure to bring in natural light, provide visibility of the forest and illumination at night.

The building is darker at the hearth of the earth where it is excavated to the lowest level -3 and gradually get lighter level by level as it is coming out of the earth. Its base with its three levels below the street level are solid with concrete piers, retaining walls and translucent glass which limits the sight of the exterior forest and allows little light in and out of the building.

The building's central void space and spiral glass staircase allows natural light to travel through the space from the skylight all the way down to the lower levels. For this reason the central void spaces increase in size as the levels rise in order to represent a vertical condition between the raw gem at the hearth of the earth at -3 level being refined, to elegantly capture the light of the sky at +3 level.

The filtering and penetrating effect of light through the transparent and translucent glass of the exterior material of the building achieves a layered glow, where natural light passes through, slows down, softens, bleeds and diffuses from one space to the next, from exterior to the interior, and through different layers of the interior, creating a superimposed overlapping penetrative effect bringing daylight further and deeper into the space.

The steel structural columns are oriented in plan according to the lines of the sun's angle on the site during the solar solstice and equinox. In levels below ground the columns become concrete piers like prongs of a setting to capture the mass of the building above ground level.

Exterior Journey

From the building's main entry / exit, the visitor may choose to cross the site valley over a pedestrian bridge or take the exterior staircase to the lowest point of the valley. The bridge with its glass floor and steel cables is a fine illuminated gesture connecting the city fabric and passing over the valley above the creek.

The exterior staircase is solid and settled in the earth which tapers down the hill alongside the building giving the guest an intimate sense of the museum by experiencing the exterior glass walls in close proximity.

Here the site visitor becomes a part of the beautiful landscape stepping down to the lowest level of the valley where a foot bridge allows one to cross over the creek to the walking pedestrian trail.

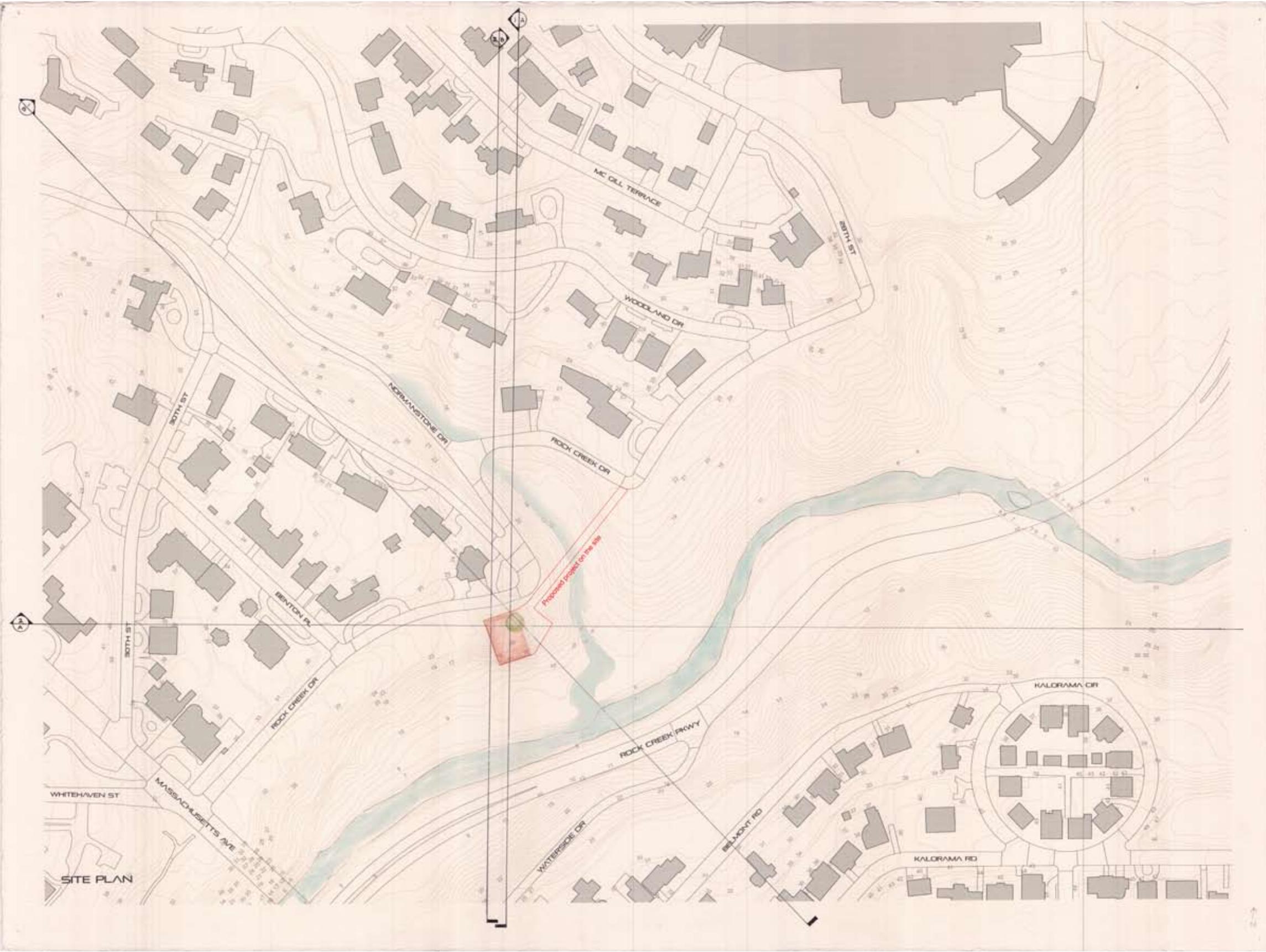
From this location, the floating glass bridge above reminds the visitor of a necklace with its architectural elements of steel cables and glass floor pieces constructed like jewelry.

site

The site is located in Rock Creek Park, Washington D.C. near the city center and yet deep in nature. Rock Creek Park is the largest unbroken forest habitat within the capital city and is one of the first national parks (established in 1890).

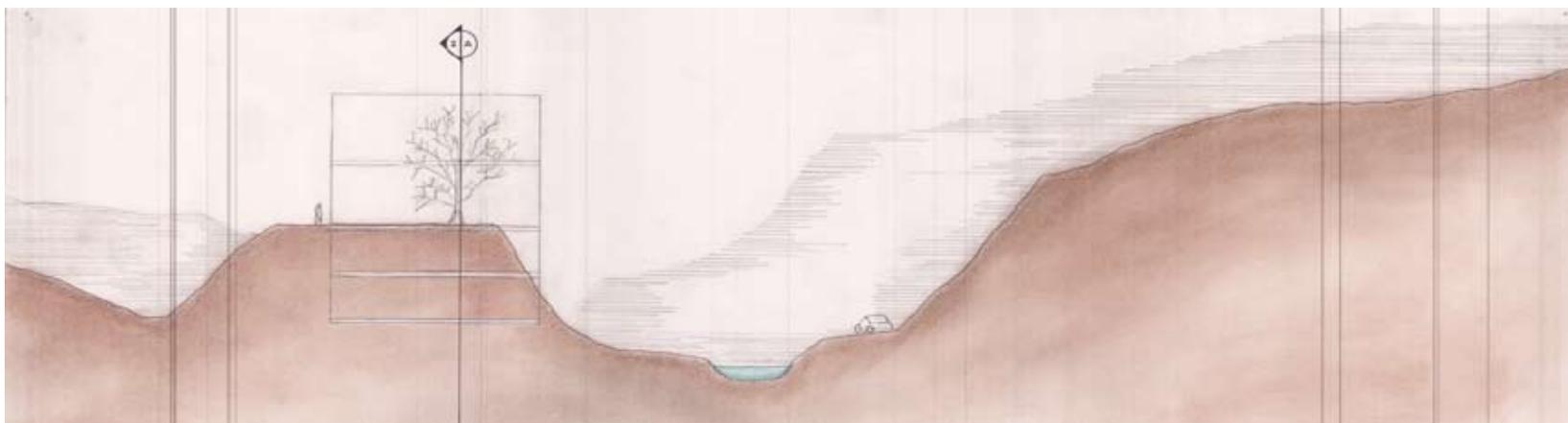
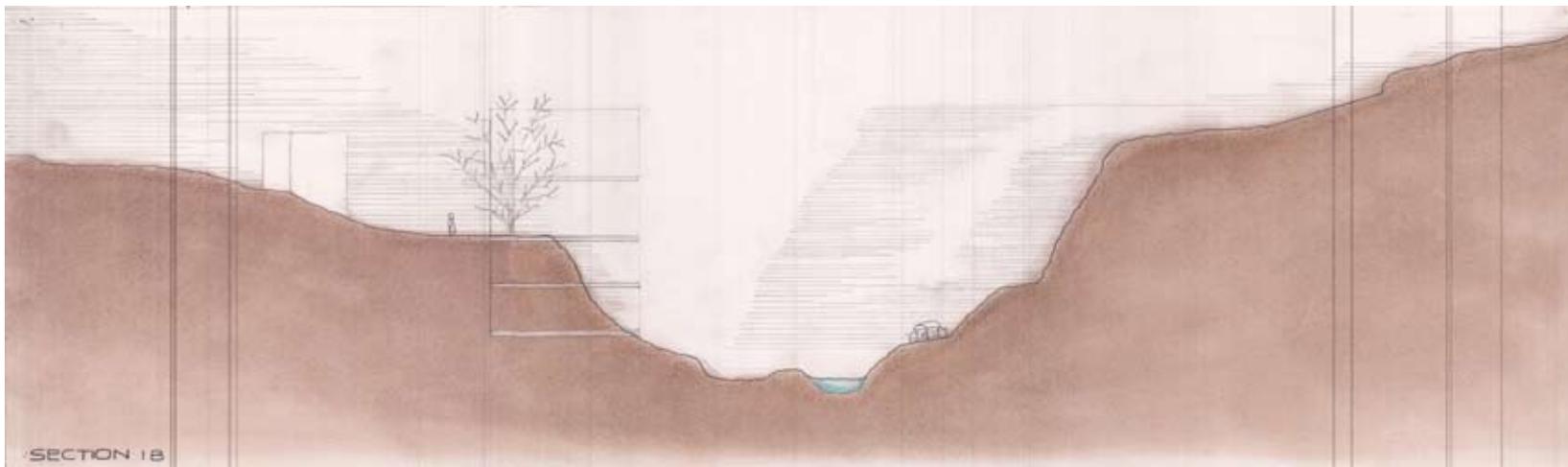
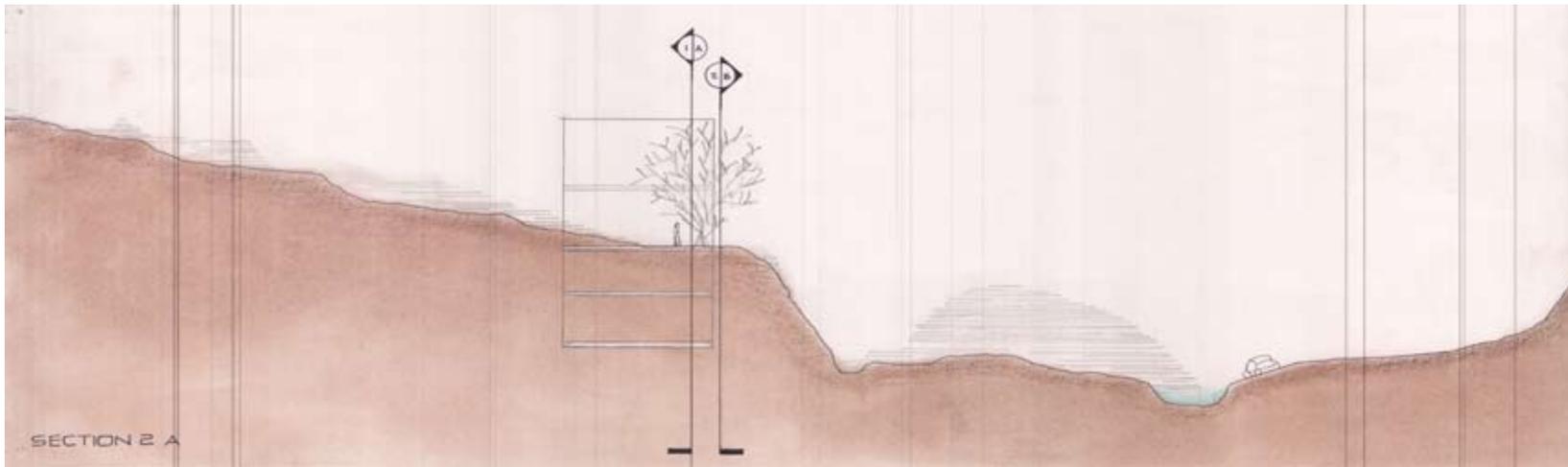
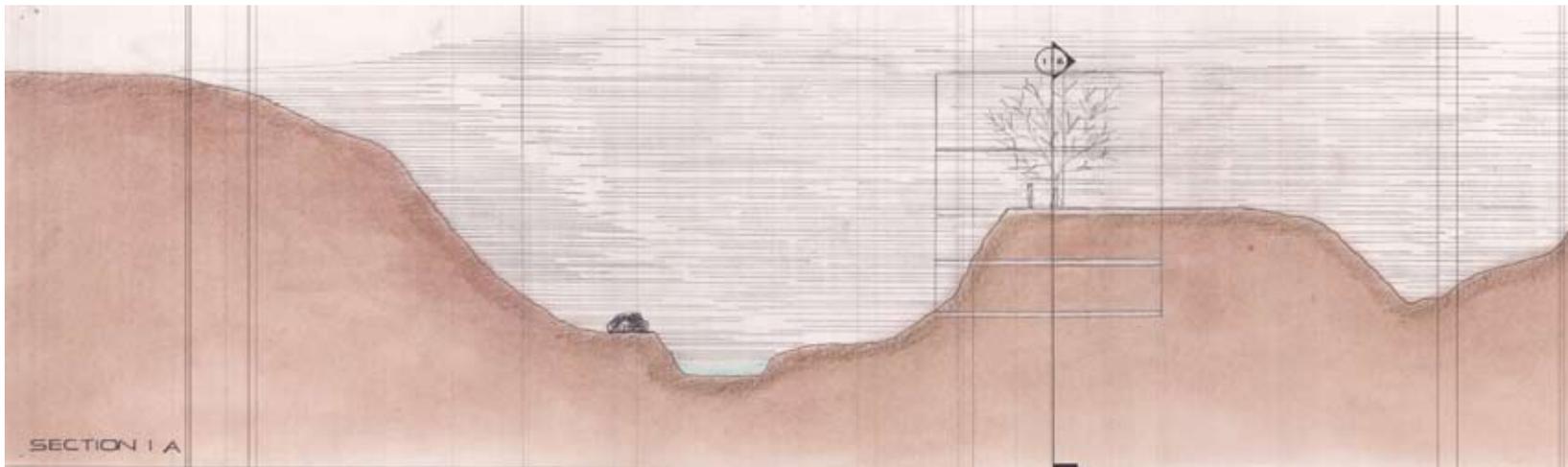
The project is sited in a valley between three main thoroughfares; Connecticut and Massachusetts avenues and Rock Creek parkway. The Maple and Oak trees range in height from 50' to 80' tall. There is a small creek that flows through the site and is a tributary to the larger Rock Creek. An existing pedestrian trail runs through the valley and branches off to the North East and South West along the Rock Creek.

The valley and cliff sides are important because they will permit the program to penetrate the valley in order to excavate and build both vertically and horizontally. The soil condition of the site is gravel and granite on the South side of the valley and sand on the North side of the valley.



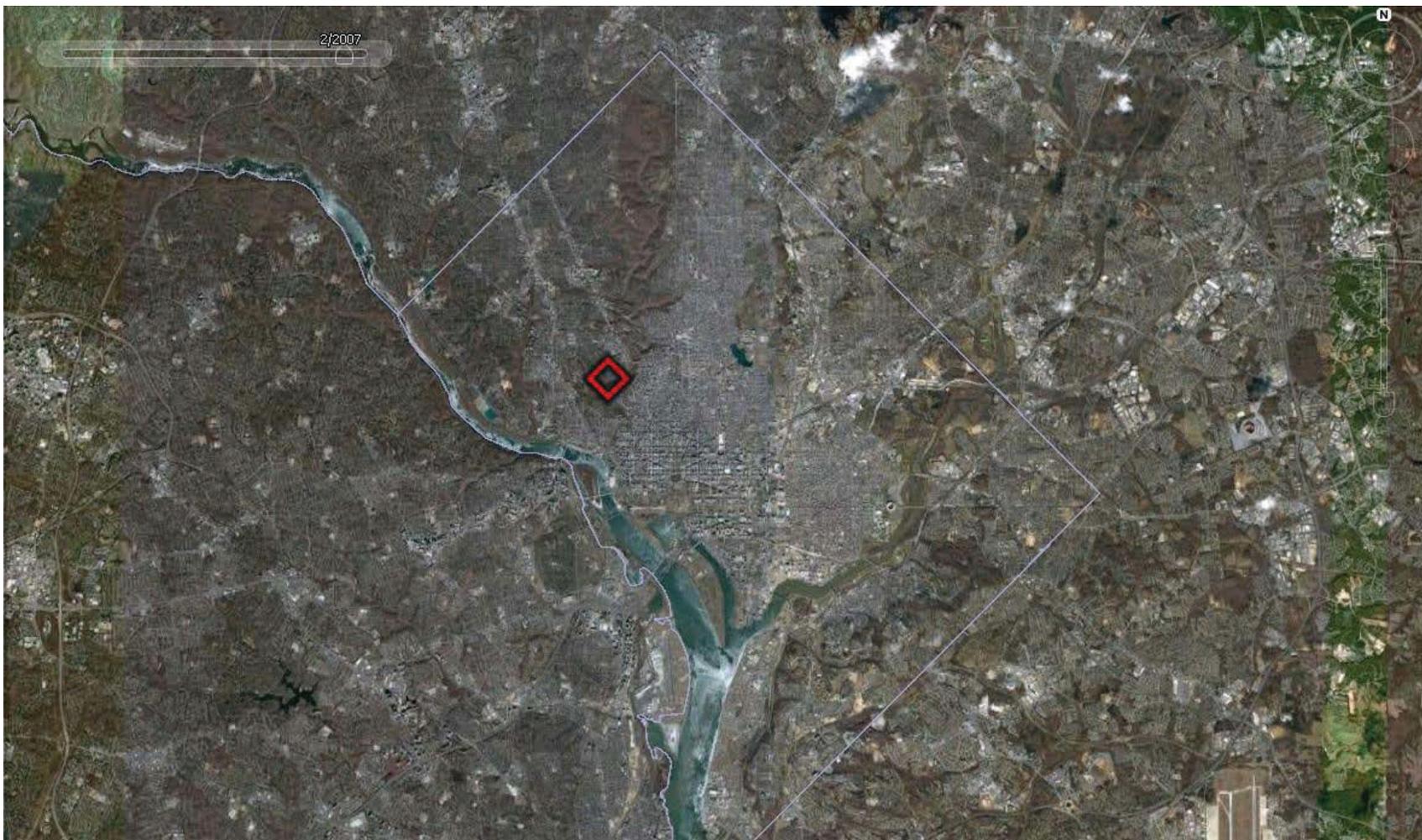
Preliminary Site plan



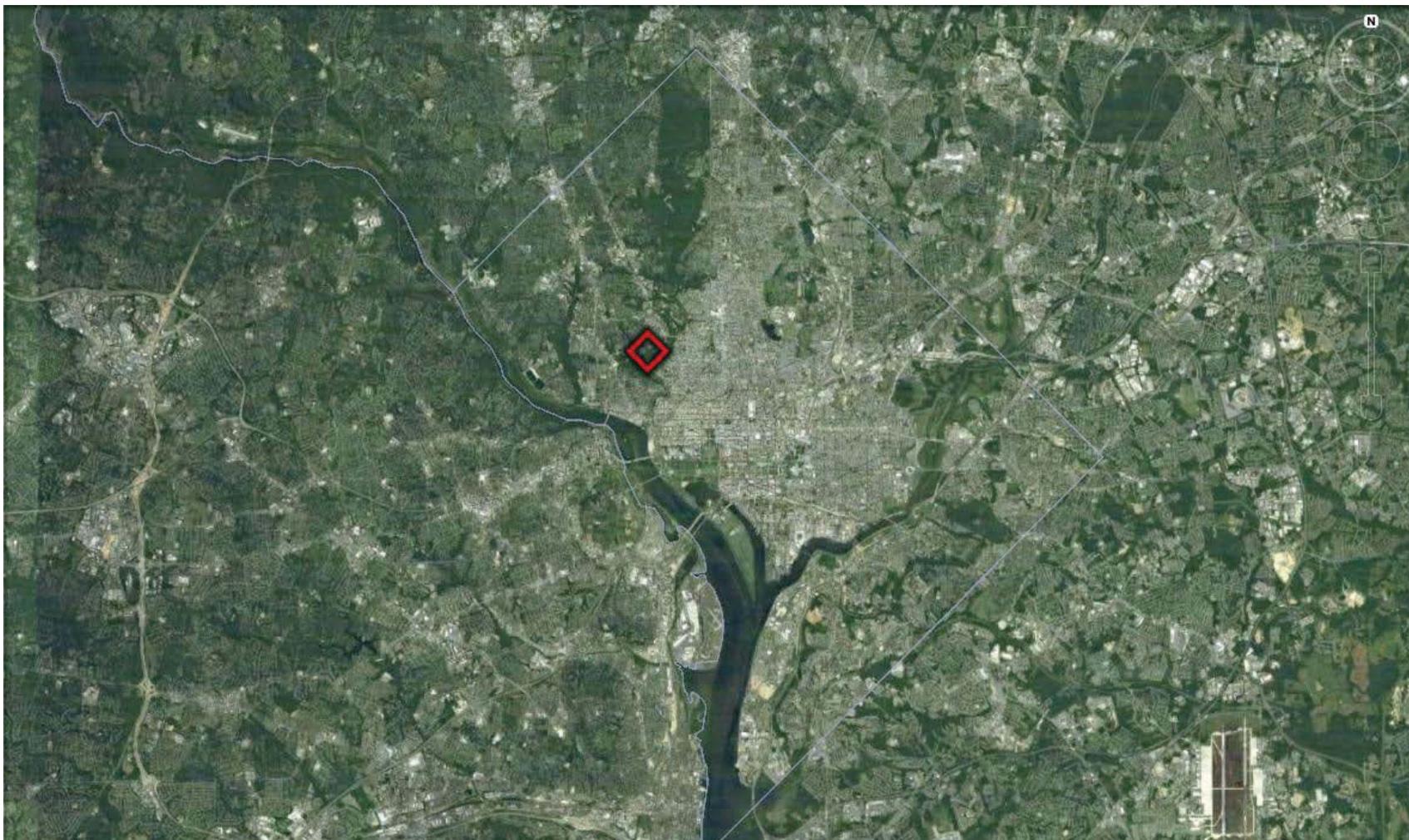


Initial Site Sections - Rock Creek Parkway - NW Washington D.C.

1" = 48'-0"



Map of Greater D.C. with thesis site indicated. Winter above & summer below.



10 Site Study Drawings

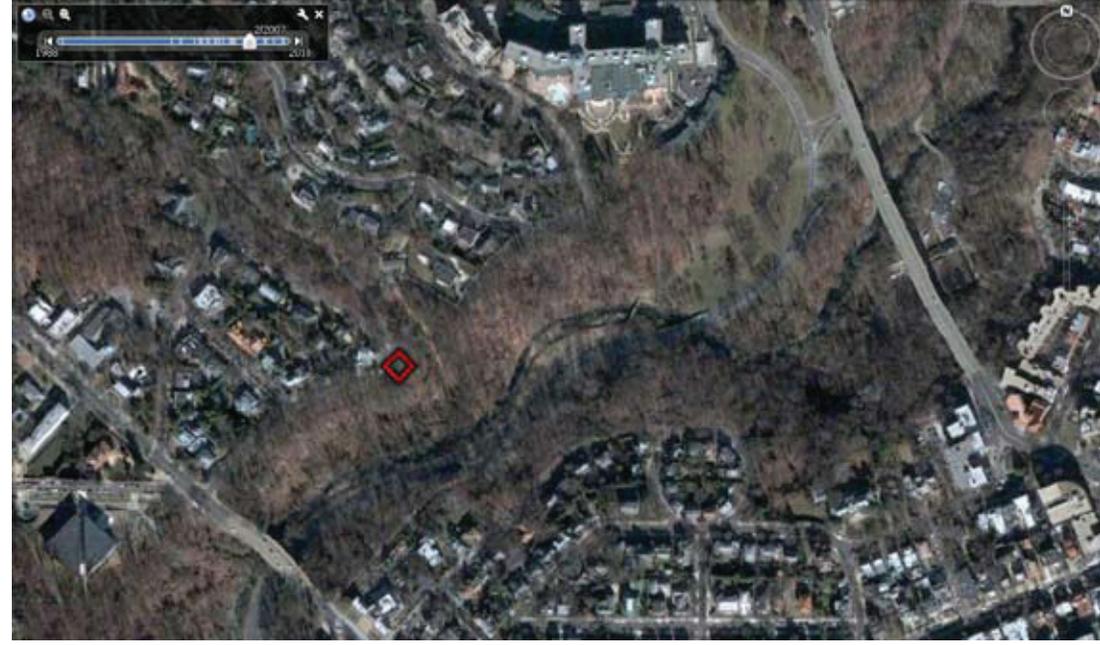
Google Map. Rock Creek Park, Washington NW, DC. <http://maps.google.com/maps?hl=en&ie=UTF8&ll=38.916648,-77.056818&spn=0.023207,0.05476&t=k&z=15>.
Fair Use determination attached.

1" = 2.5 Miles

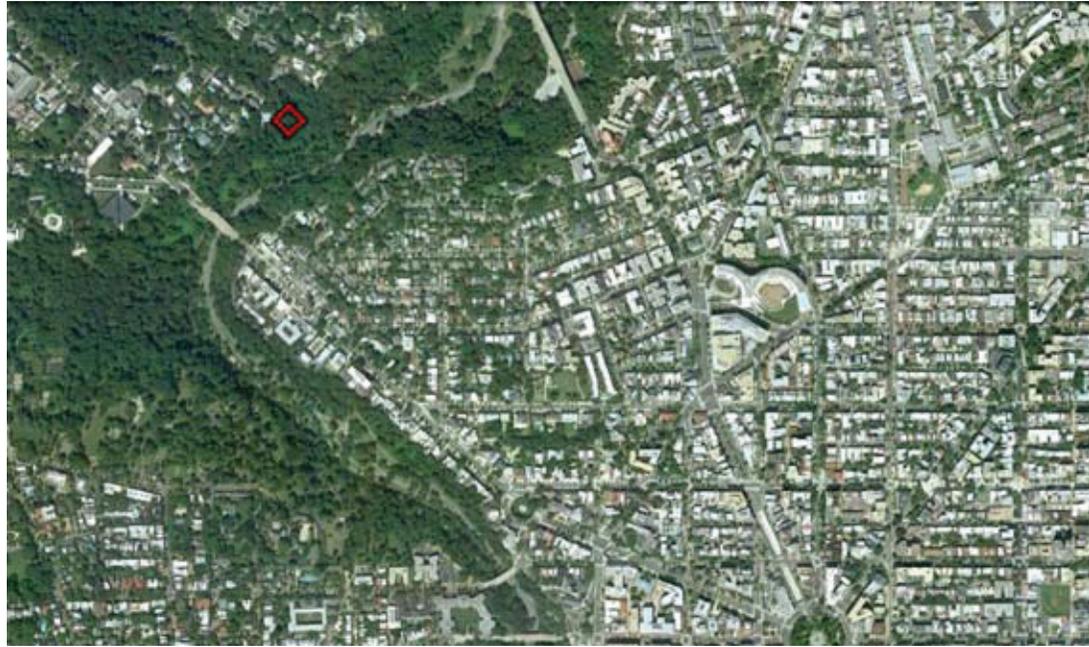




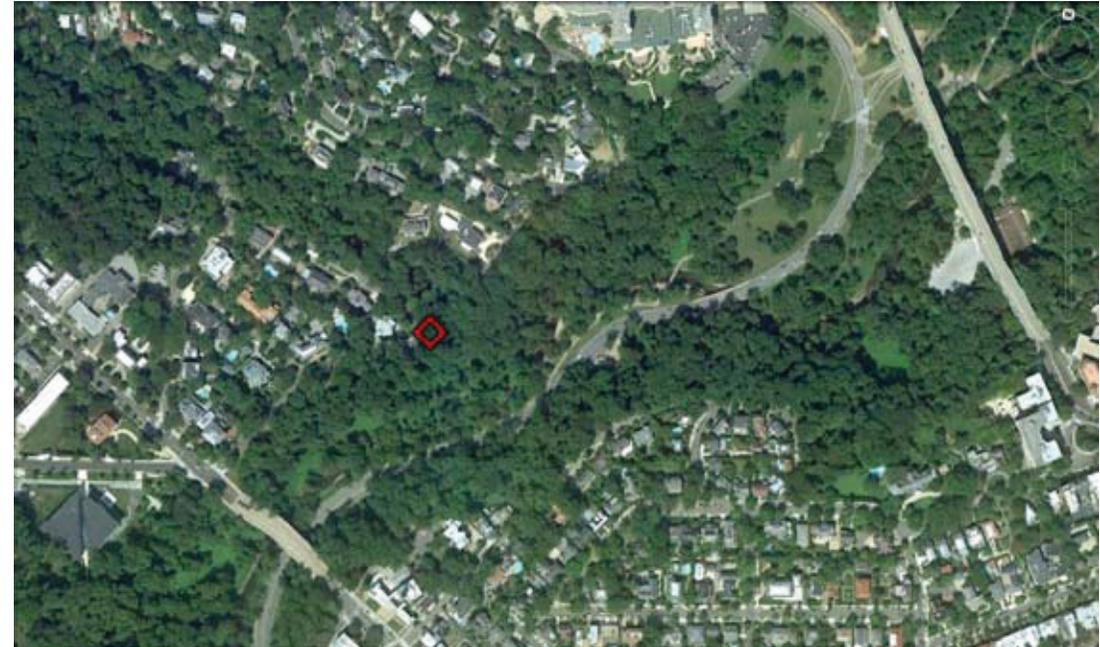
Map of Neighborhood.



Map of immediate site



1" = 1000'-0"



1" = 500'-0"

Google Map. Rock Creek Park, Washington NW, DC. <http://maps.google.com/maps?hl=en&ie=UTF8&ll=38.916648,-77.056818&spn=0.023207,0.05476&t=k&z=15>. Fair Use determination attached.



View from Massachusetts Avenue - Looking North

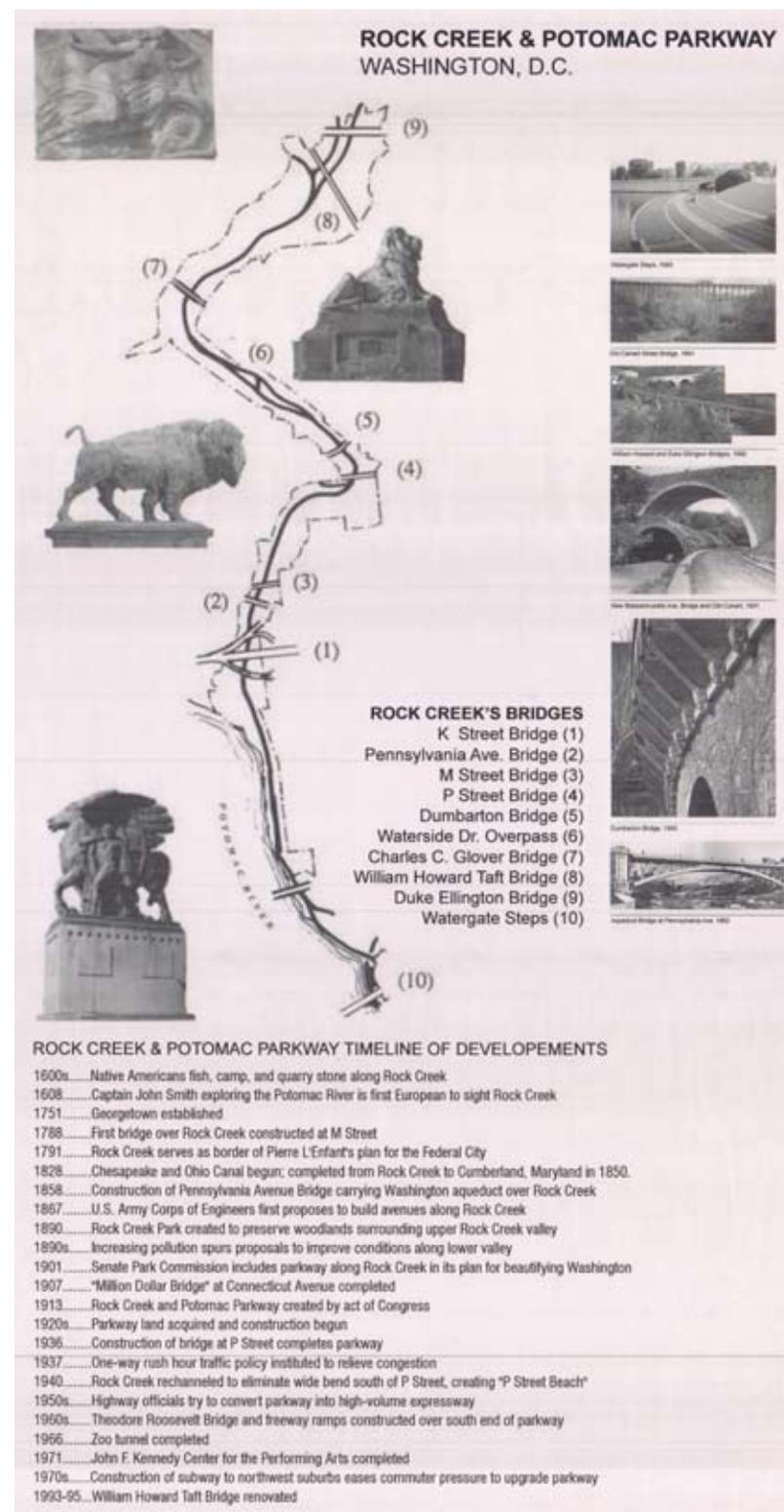
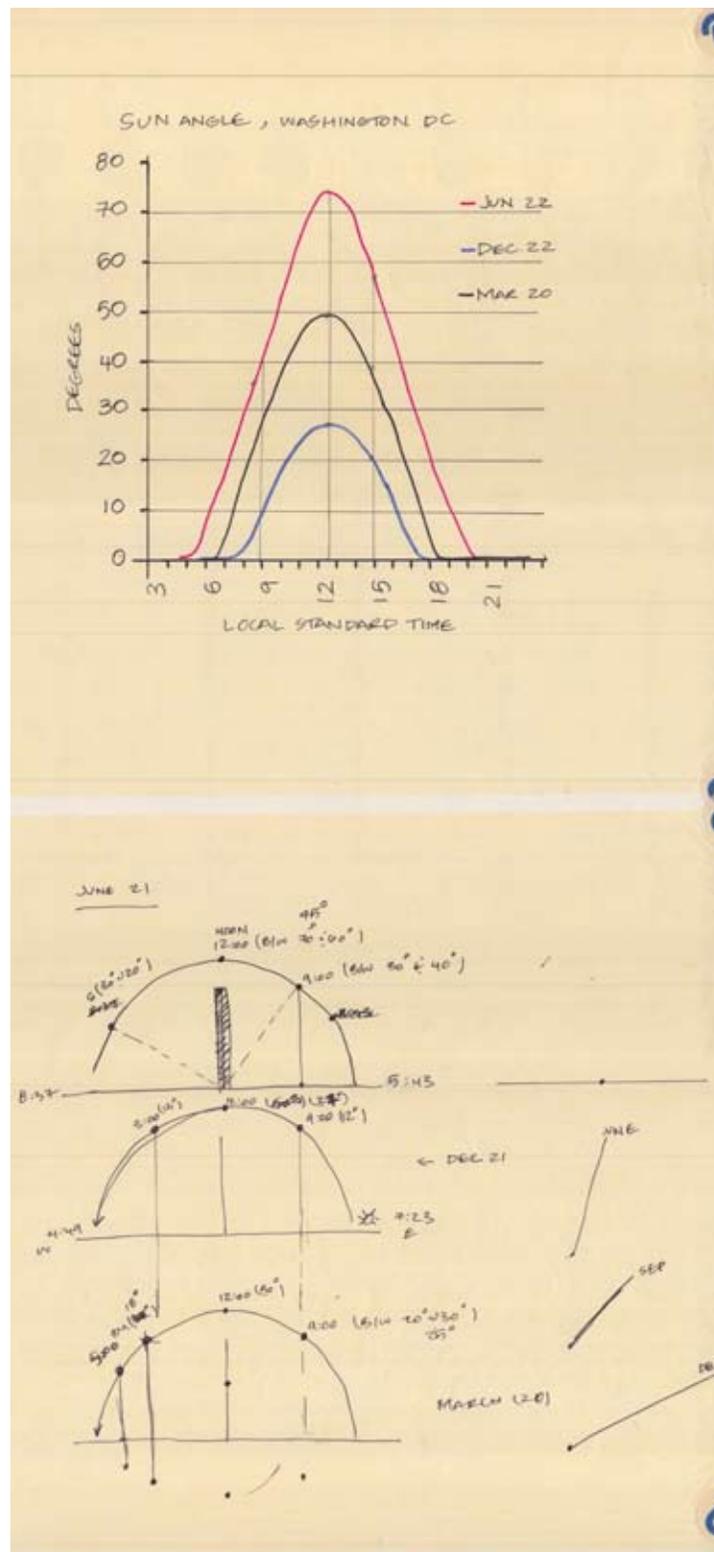
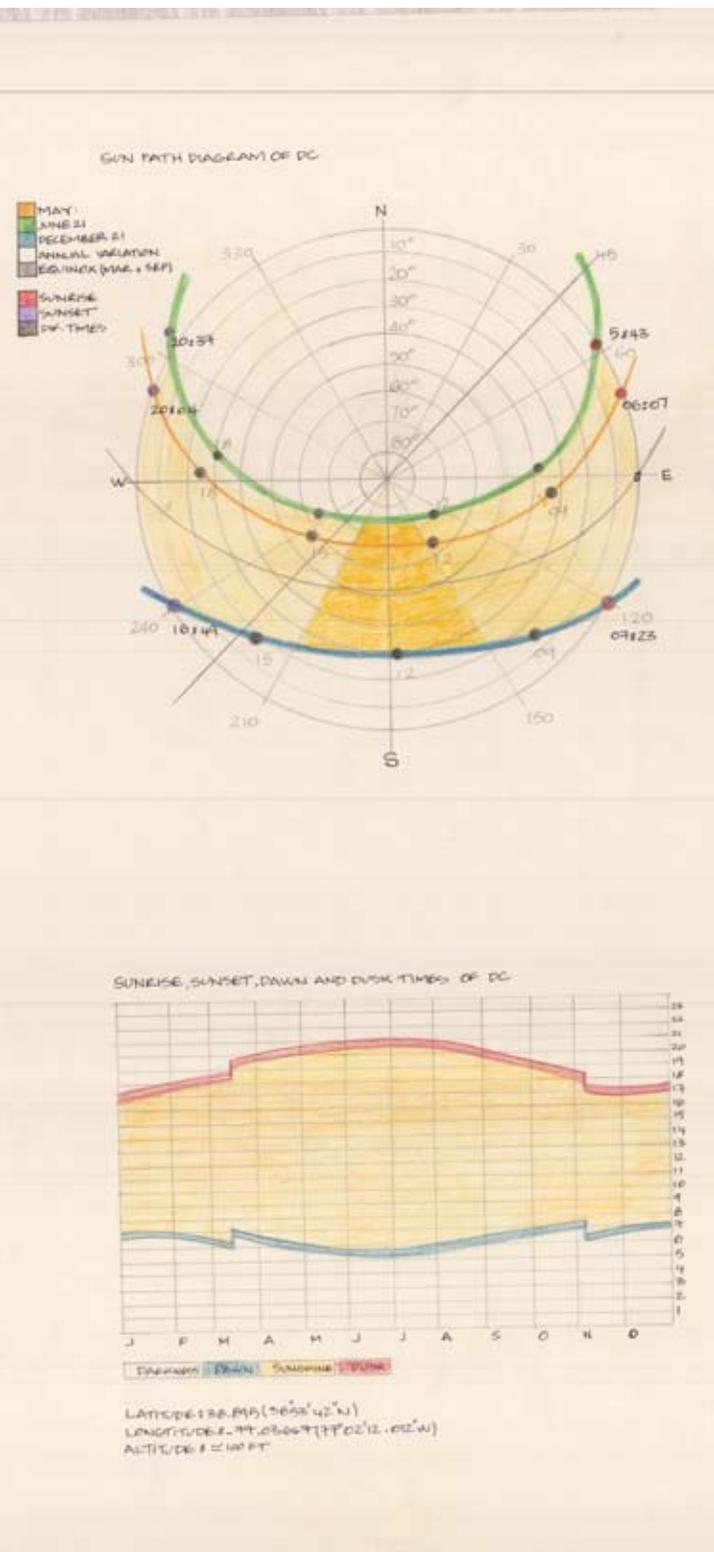


View from Rock Creek Drive - Looking North West

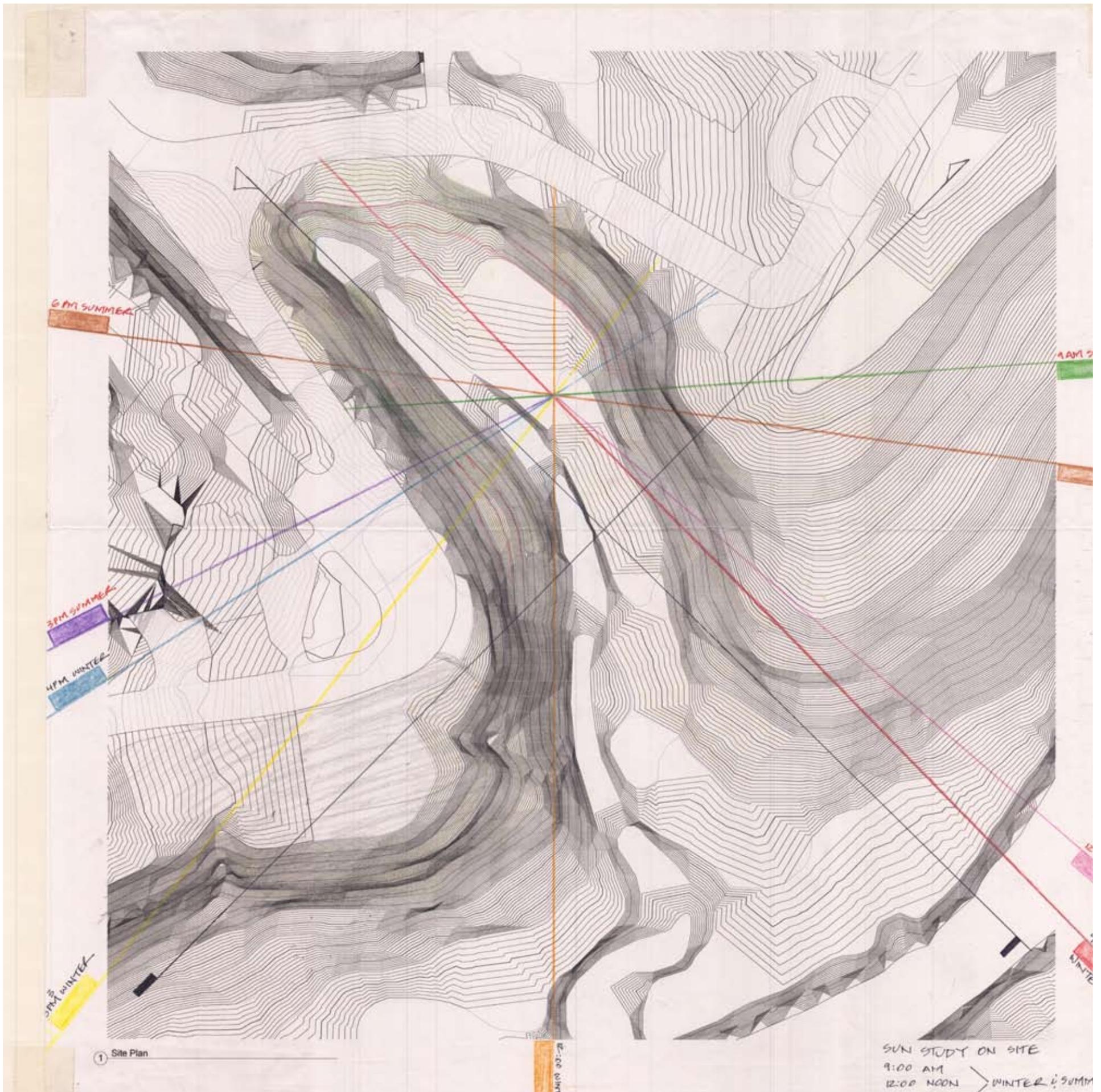


View from Rock Creek Drive - Looking North

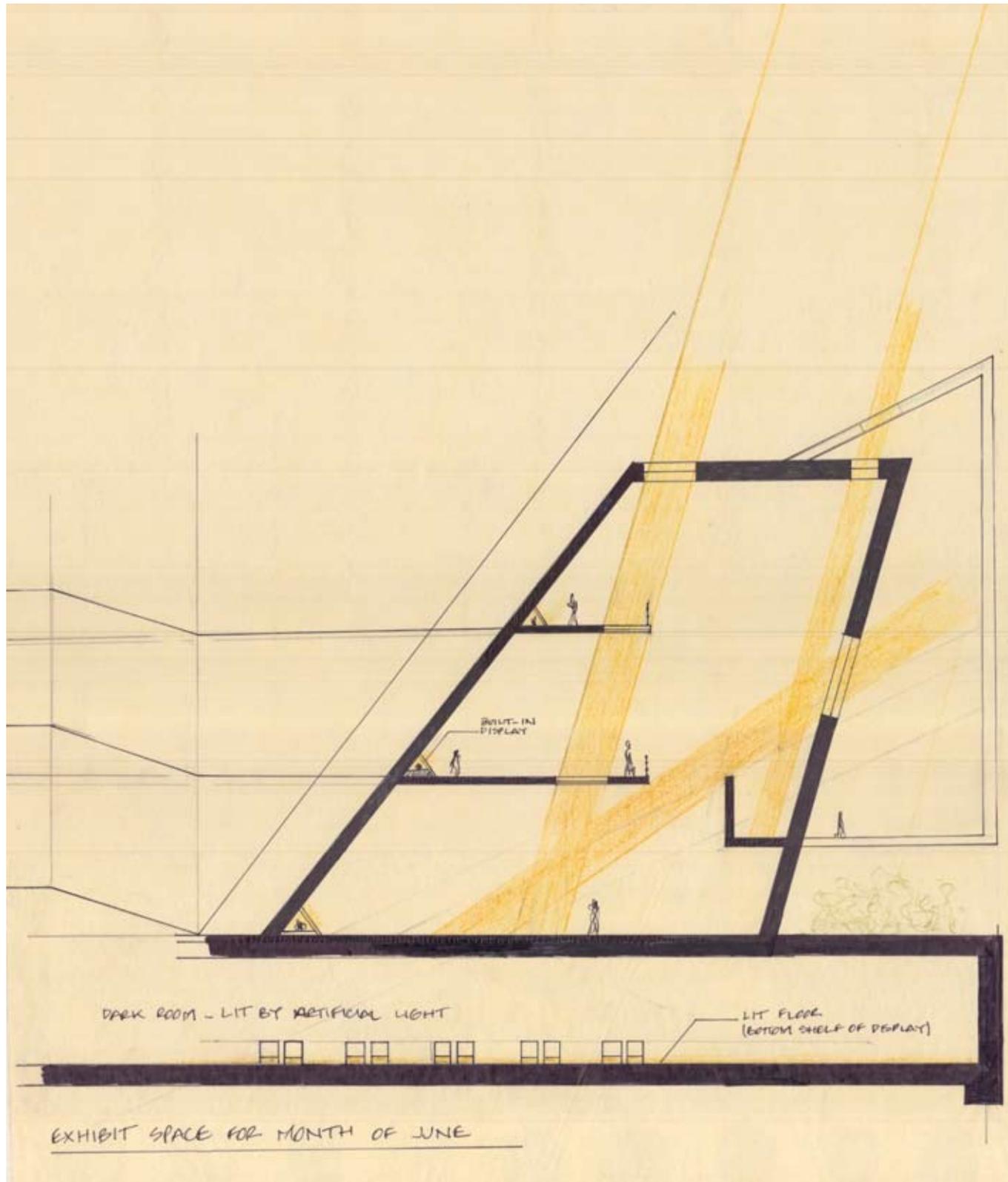




1. Rock Creek and Potomac Parkway. Rock Creek Bridges. June 04, 2010. National Park Service. http://www.nps.gov/history/history/online_books/hih/rock_creek_potomac/rock_creek_potomac10.htm (accessed Feb. 14, 2010). Fair Use determination attached.



Sun angles on the site - Rock Creek Park NW



Sun angles on conceptual section drawing





GEOMETRIES.....COLORS.....SHAPES.....LIGHT.....DISPLAYS.....



Inspirational Images

2. Gwen Vanhee's photostream. Geom, June 5, 2010. Flickr. <http://www.flickr.com/photos/hildeengwenverbouwen> (accessed Feb. 14, 2010). Fair Use determination attached.

3. Ambient Gem. April 10, 2008. Veech Media Architecture. <http://www.veech-vma.com/2008> (accessed Feb. 14, 2010). Fair Use determination attached.

research

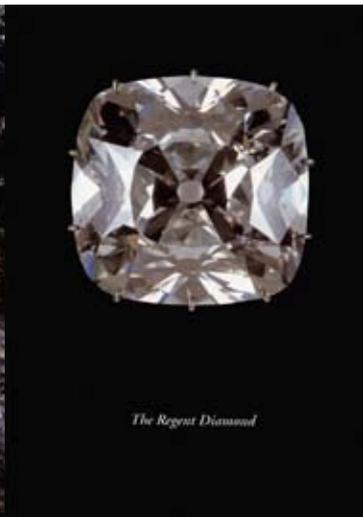
Surviving a boiling, incandescent universe, merciless pressures, inexorable clashes and conflagrations, tortured matter, poignantly beautiful, takes shape, at peace at last....

Resisting the hazards of wear and breakage, a fragile architecture of crystals, of polygons and pyramids, unfolds its immutable geometry, infallible, immortal, prefiguring Pythagoras and Plato....

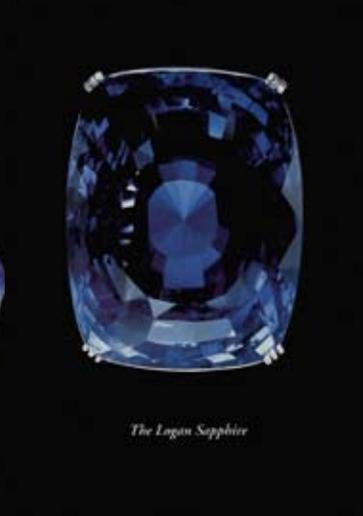
In these structures, forged by the most brutal of forces and ennobled by them, the law of equilibrium triumphs. Indeed, so should it be. During their formation in the heart of burning chaos, this balance was doubtless no more than an interplay of unstable and crude elements....Perhaps there is no better paradigm of pure beauty than these still forms that have emerged from such turbulent discord.

Roger Caillois,
Pierres (Stones), 1966

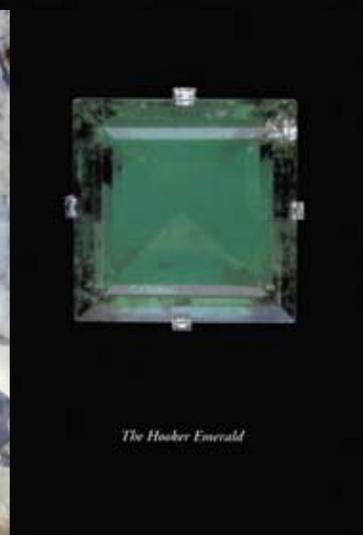
Voillot, Patrick. *Diamonds and Precious Stones*. London: Thames and Hudson Ltd., 1998.



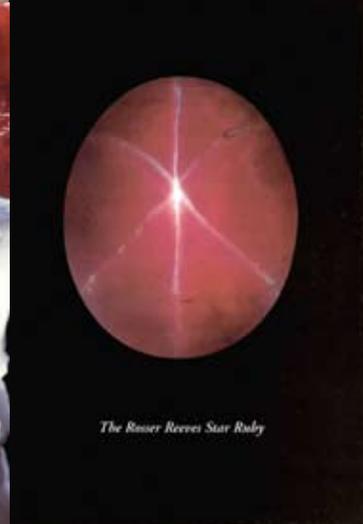
The Regent Diamond



The Logan Sapphire



The Hooker Emerald



The Rosser-Reeves Star Ruby



The legendary Valley of Diamonds guarded by snakes with deadly eyes.

5. Voillot, Patrick. *Diamonds and Precious Stones*. London: Thames and Hudson Ltd., 1998. Fair Use determination attached.

" Was it a flash of divine insight, or the slower process of observation and deduction, that led human beings to perceive an esoteric quality in stones?

They saw beauty in the sunrise; but the sun became blinding by midday. There was color in leaves and flowers, until they withered. Water sparkled, but it could not be worn for long. Of all the natural wonders of the earth, only the stones endured. They must indeed be magical; and those who possess magical things can sometimes put to work the magic in them."

Cornelia Parkinson,
Gem Magic: The Wonder of Your Birthstone, 1988
Voillot, Patrick. *Diamonds and Precious Stones*. London: Thames and Hudson



An emerald fresh from the mine, still embedded in its calcite matrix.

6. Voillot, Patrick. *Diamonds and Precious Stones*. London: Thames and Hudson Ltd., 1998. Fair Use determination attached.

The Mysterious Origins of Precious Stones

Since the beginning humankind has been fascinated by gems and minerals pleasant to touch and filled with mystery, whose shapes captivate, and whose colors and luster entrance. They enthralled our ancestors, partly because of their exceeding rarity, and they loomed large in the symbolism of the ancient world. Nor have they lost that magical charisma.

In Western culture, the symbolic meanings of gemstones were traditionally related to their colors, which in turn were associated with moral qualities through imitative or sympathetic magic.

According to common belief, a stone's color also gave it the ability to heal body organs of the same shade: thus, a ruby was thought to cure disorders

of the blood, an emerald those of the eyes, and so on. Even today some patent medicines contain powdered gems, and with the renewed interest in alternative medicine that has arisen at the end of 20th century lithotherapy, the use of gems and crystals for healing purpose, has enjoyed a new popularity.

A gemstone's color conveys its symbolic power. Inspired by nature, our ancestors chose the white brilliance of the diamond to represent light, the green of the emerald for the rebirth of the seasons and of the life, and the blue of the sapphire for the heavens. From the beginning, the world's great religions have mentioned gemstones in their sacred texts as important symbols of spiritual values.

Precious and extremely rare, these stones were seen as having exceptional, almost divine, nature. This quasidivine quality was reinforced by the fact that until 15th century most gems were mysterious to Europeans. Their origins were in distant, unknown lands; they arrived from these exotic, half-mythical places almost miraculously, carried by merchants or messengers from the ends of the world, and came to their destinations bereft of information about the place or manner of their extraction.

Cornelia Parkinson,
Gem Magic: The Wonder of Your Birthstone, 1988

Voillot, Patrick. *Diamonds and Precious Stones*. London: Thames and Hudson

We live for the most part within enclosed spaces. These form the environment from which our culture grows. Our culture is in a sense a product of our architecture. If we wish to raise our culture to a higher level, we are forced for better or for worse to transform our architecture. And this will be possible only if we remove the enclosed quality from the spaces within which we live. This can be done only through the introduction of glass architecture that lets the sunlight and the light of the moon and stars into our rooms not merely through a few windows, but simultaneously through the greatest possible number of walls that are made entirely of glass, colored glass.

The new environment that we shall there by create must bring with it a new culture perhaps the honored reader apprehends that glass architecture is a bit cold. But, during the warm season the cold is quite agreeable. At all events, I venture to say that the colors in the glass have a glowing effect, perhaps a 'new' warmth streams out. It may be said that at great periods of architecture ceilings were always skies.

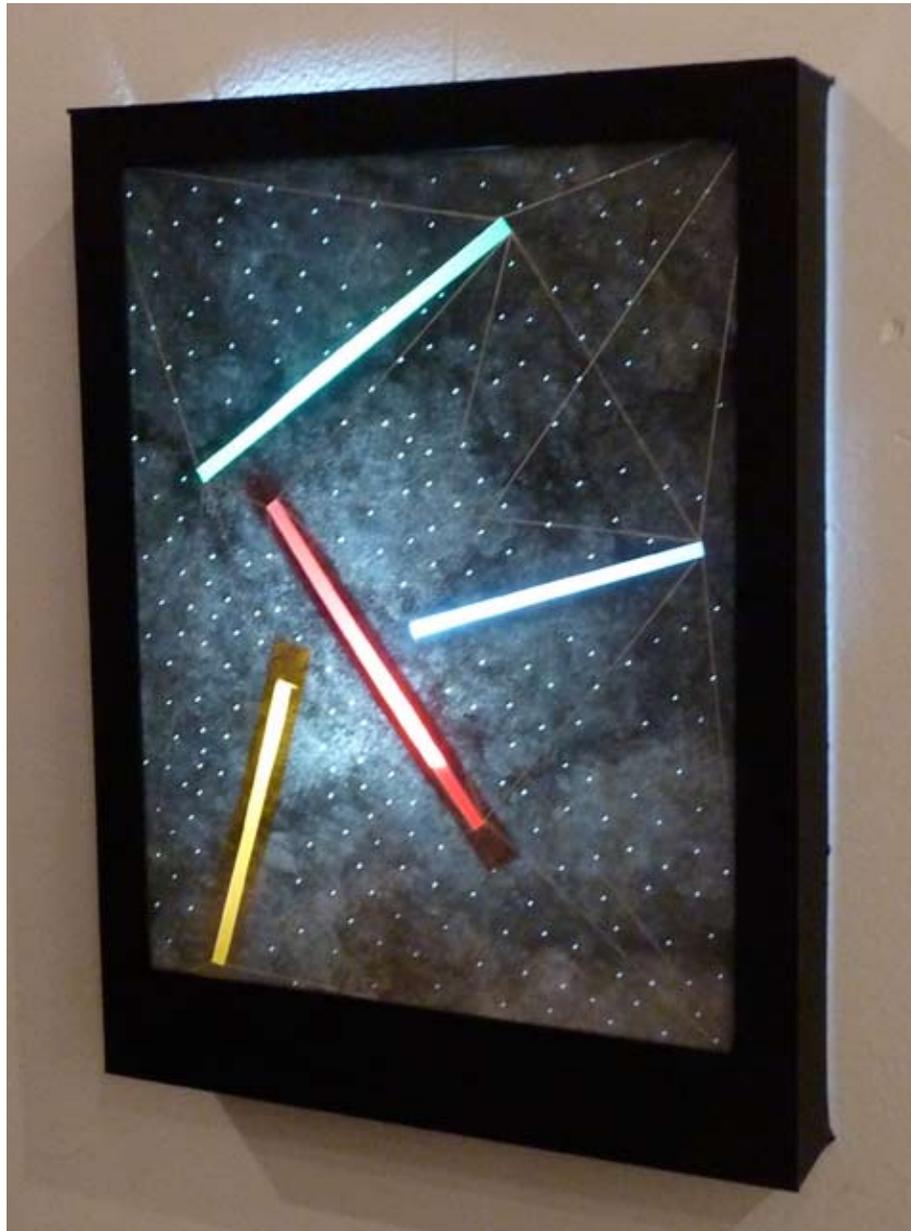
Viollet-le-Duc tells us, in his *Dictionnaire de l'Architecture* (Art. Peinture), that the whole scheme of interior color had to be readjusted in the thirteenth century to harmonise with the vaults, which were painted the most brilliant of blues, parsemee, with gold stars, against which nothing could hold its own but vermilion, black, and more gold.

The Sainte Chapelle of Paris may be taken for example; and in England, 'Conrad's glorious choir,' built in 1150. In Italy, at the same time, the practice was universal. It will suffice to refer to Siena and Orvieto Cathedrals with their vaults, stars on azure; in Orvieto, still untouched, in wonderful harmony of changing and decaying color, blue to emerald, like the evening sky while as yet the earliest star alone burns there.

The lighting of this monument, which should resemble that on a clear night, is provided by the planets and the stars that decorate the vault of the sky. The arrangement of the planets corresponds to nature. These planets are in the shape of and resemble funnel-like openings which transpierce the vaulting and once inside assume their form.

The daylight outside filters through these apertures into the gloom of the interior and outlines all the objects in the vault with bright, sparkling light. This form of lighting the monument is a perfect reproduction and the effect of the stars could not be more brilliant.

It is easy to imagine the natural effect that would result from the possibility of increasing or decreasing the daylight also easy to imagine how the somber light that would prevail in this place would favor the illusion.



Collage Model Studying Light

design process

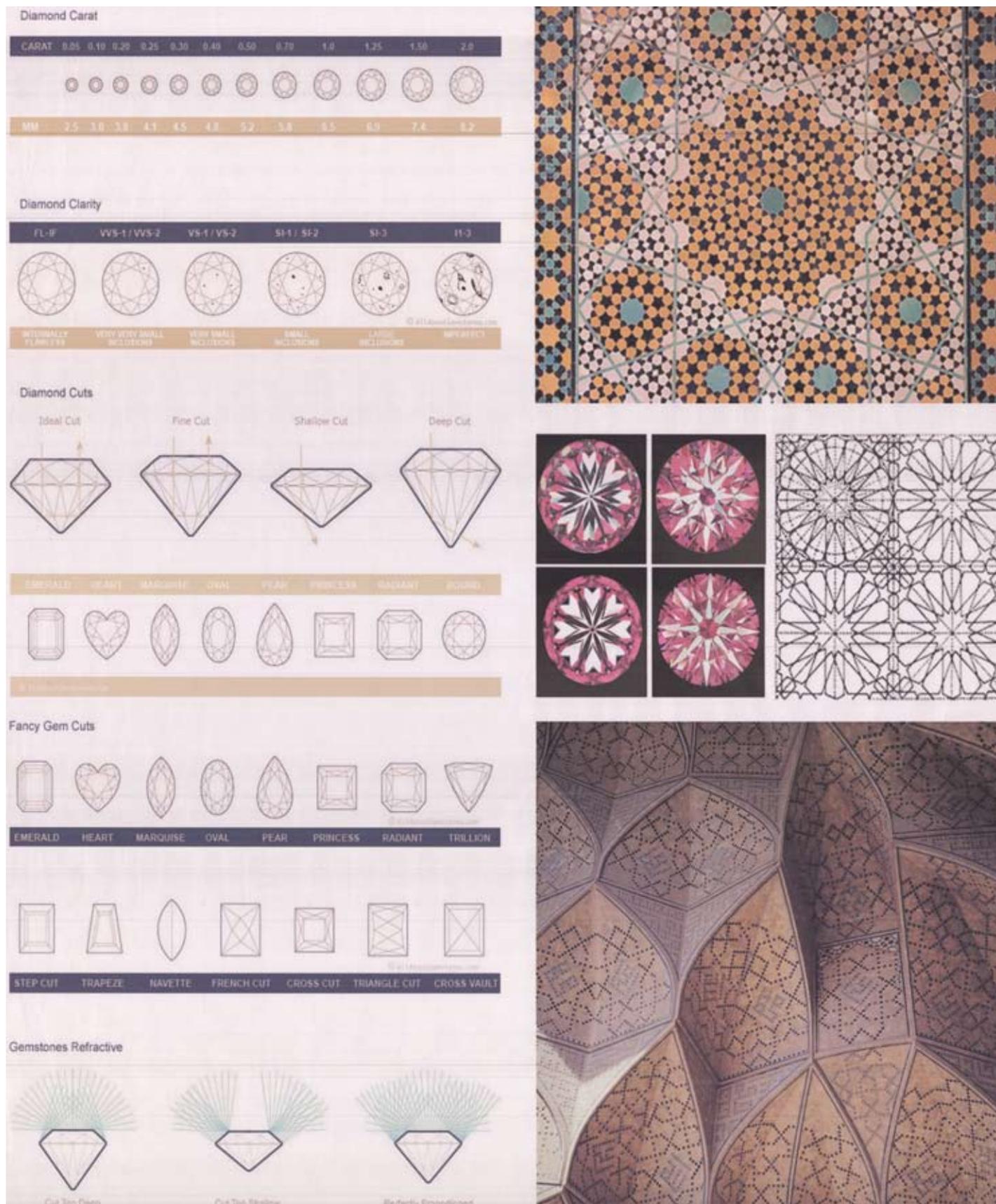
GARNET		CITRINE		RUBY		DIAMOND	
AMETHYST		JOURMALINE		PERIDOT		EMERALD	
AQUAMARINE		SAPPHIRE		SAPPHIRE		EARL	
WINTER		FALL		SUMMER		SPRING	

Color of the birthstones of each month and season



World Gemstone Map

8. World Map of Gemstones. June 10, 2011. <http://www1.goodeur.tk/vlrldi1gn?junn7=jtjYz%2B0bpOnh283amN%2FT2augb56V383JsQWQy9fQ4HS6wsKK0eivm5qrIN2qOblm4vX286n1823fJ%2BV09bP4Omn4tvR0qzU4ZXHyLLHvZDe3qvtVlCkKpeqopibpaeUqtVQ49nYspjh09mrpmylePY0bLUm5%2Bqo59snNOnxYvp5aebqJ6nbpiooZ5Zm9bZ19bX3HTe5uaYk93T3M7Z095c1eLU1srioNzco9zjXdDj1ahf7%2Bfh0eyU4JzNrNfy2eWXnauaoLRcmbXm29yj1NbZ3JzRn9zh0szO4%2BDZ4Nbi16bV4p3T19yXnLDs5NxxktZt19nk4M%2FdouObqpTcONSJ> (accessed Feb. 14, 2010). Fair Use determination attached.



Carats & Cuts of Stones - Persian Architecture Motifs & Forms

9. Persian Motifs. July 03, 2011. http://www.google.com/imgres?imgurl=http://us.cdn4.123rf.com/168nwm/rchicano/rchicano1008/rchicano100800012/7709918-illustration-of-geometrical-pattern-in-warm-color.jpg&imgrefurl=http://www.123rf.com/clipart-vector/persian.html&usq=__Je0rbB4Rc2BG3czG1gIps5stk_1=&h=98&w=168&sz=7&hl=en&start=34&sig2=3zG_1xleXf_4demUR6ZjeA&zoom=1&tbnid=kBeKvmtqcEUAhM:&tbnh=78&tbnw=134&ei=oOYPTqSVOKf10QHD48iTDg&prev=/search%3Fq%3Dpersian%2Bgeometric%2Bmotifs%26hl%3Den%26rls%3Dcom.microsoft.en-us:IE-SearchBox%26rlz%3D117ADRA_en%26biw%3D1440%26bih%3D688%26tbn%3Dsch&itbs=1&iact=hc&vpx=1201&vpy=384&dur=1950&hovh=78&hovw=134&tx=121&ty=53&page=2&ndsp=21&ved=1t:429,r:13,s:34&biw=1440&bih=688 (accessed Feb. 14, 2011). Fair Use determination attached.

Marking
Cleaving
Sawing
Girdling (Bruting)
Faceting (Cross Working)
Brillianting

G E M C U T T I N G T E C H N O L O G Y

CLEAVAGE AND PARTING IN GEMSTONES
The term "cleavage" refers to the splitting, or parting of a mineral along defined "planes" that are related their crystalline structure. In certain varieties of gemstones the chemical bond, or molecular cohesion between layers of atoms is weaker in certain crystallographic directions, and breakage will occur along smooth, flat surfaces that are parallel to the zones of weakness. The crystalline structure of a mineral will determine whether it will separate in only a single direction, or in two, three, four, five, or even six different directions. Some gemstone varieties have no cleavage at all. These minerals can fracture, but the breakage is not due to any inherent weakness in their atomic structure. Additionally, a fracture typically has none of the geometric sharpness of cleavage.

Basal Cleavage Prismatic Cleavage Cubic Cleavage

JEWELRY & GEM HISTORY

GEMOLOGY & GEOLOGY

METALLURGY

MATERIAL

3 CATEGORIES OF COLORED GEMSTONES GRADING...Hue...Saturation...Tone

GEMSTONES COLORATIONS
The visual appeal and characteristics of a gemstone are determined by several factors including: brilliance (sparkle), color, fire (light dispersion), and luster (surface reflectiveness). A stone's brilliance, fire, and to a lesser extent luster, are influenced by the type of cut used.

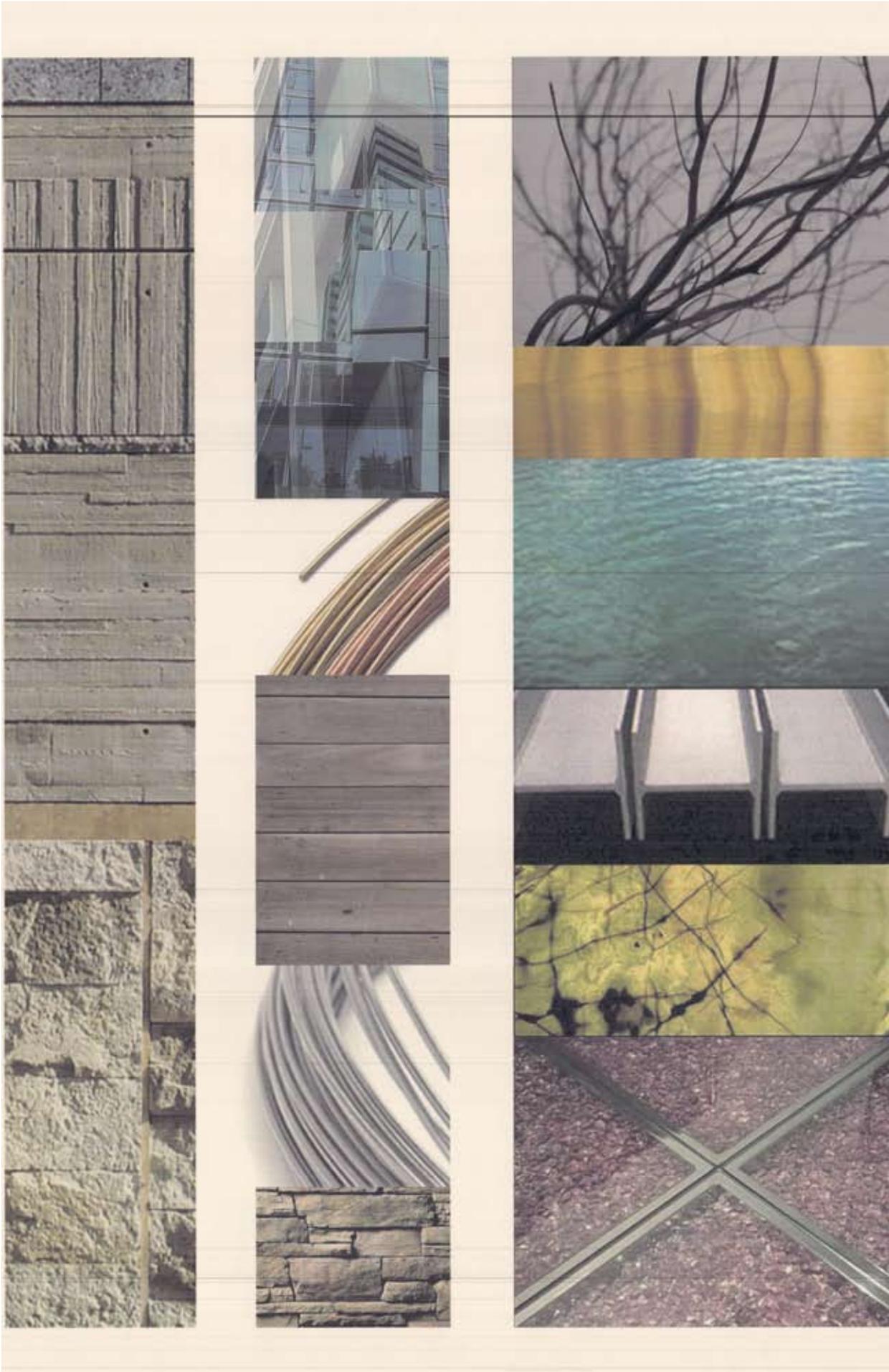
EVALUATING GEM COLORS
When evaluating a stone's color it is important to view comparisons under a light source with a uniform color-temperature, preferably at 5,000K daylight. This is the equivalent of northerly light at midday - without direct sunlight hitting the stone.

JEWELRY DESIGN & PRODUCTION

G E M S T O N E S

Gemstone Qualifications

10. Diamonds, Gems & Jewelry. All about Gemstones. June 20, 2011. <http://www.allaboutgemstones.com> (accessed Feb. 14, 2010). Fair Use determination attached.



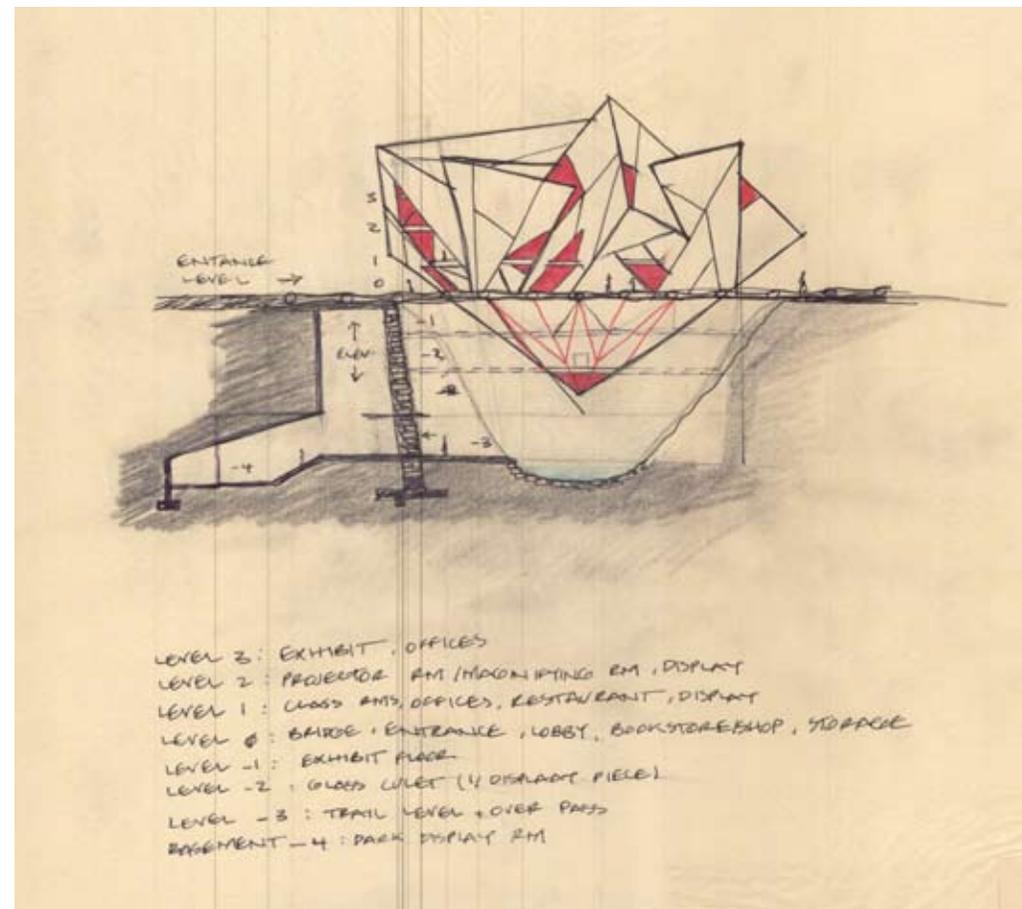
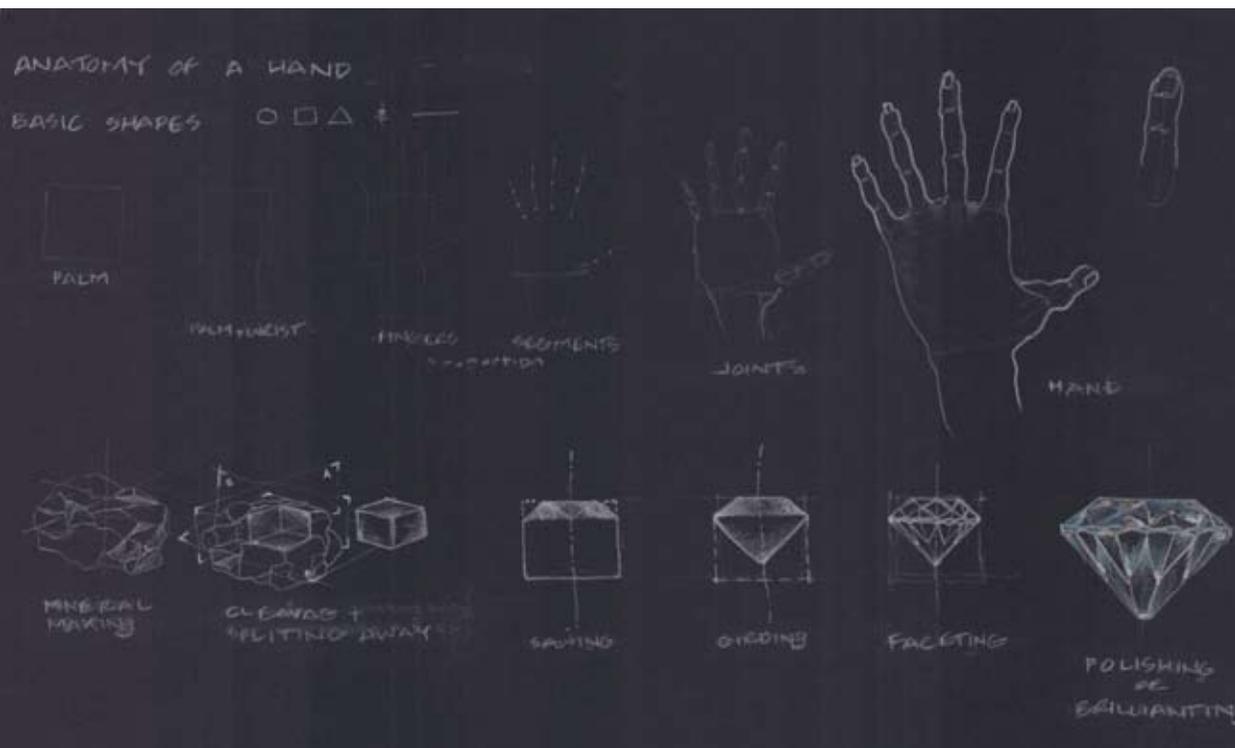
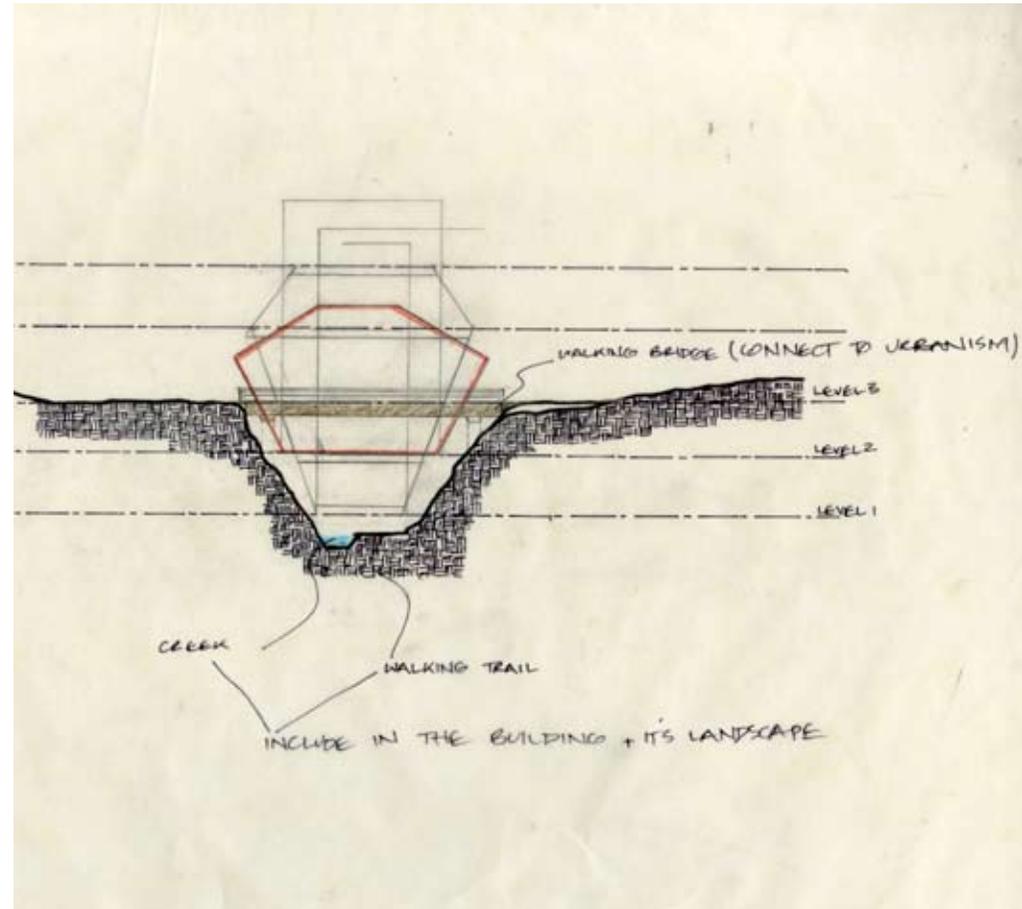
Architectural Material Studies

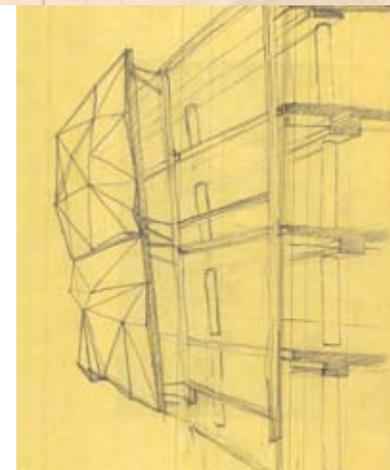
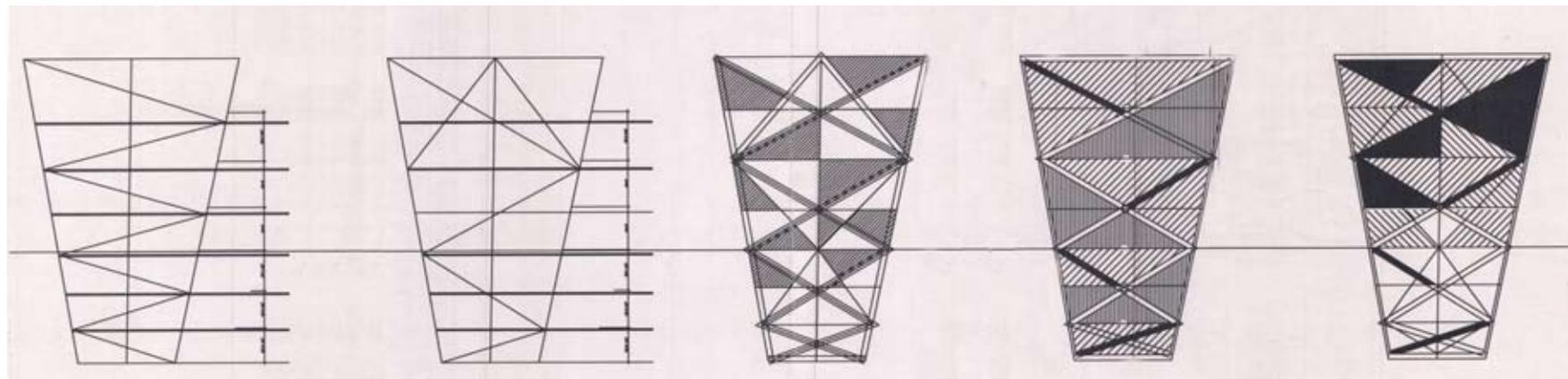
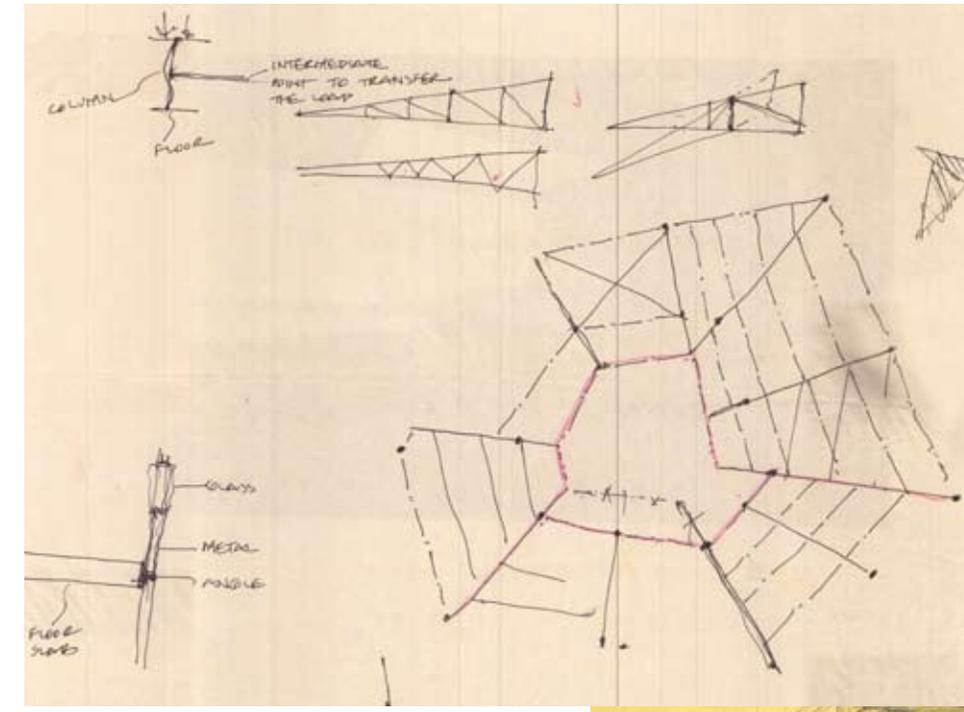
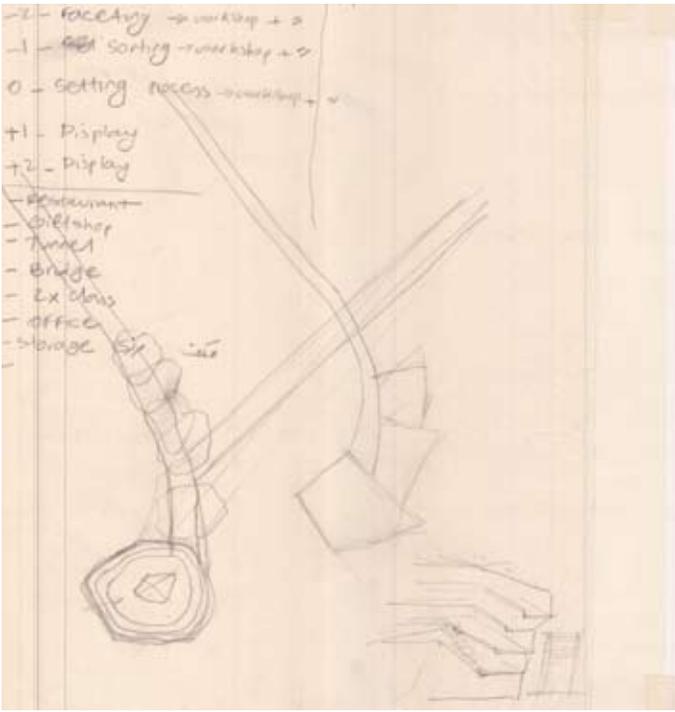
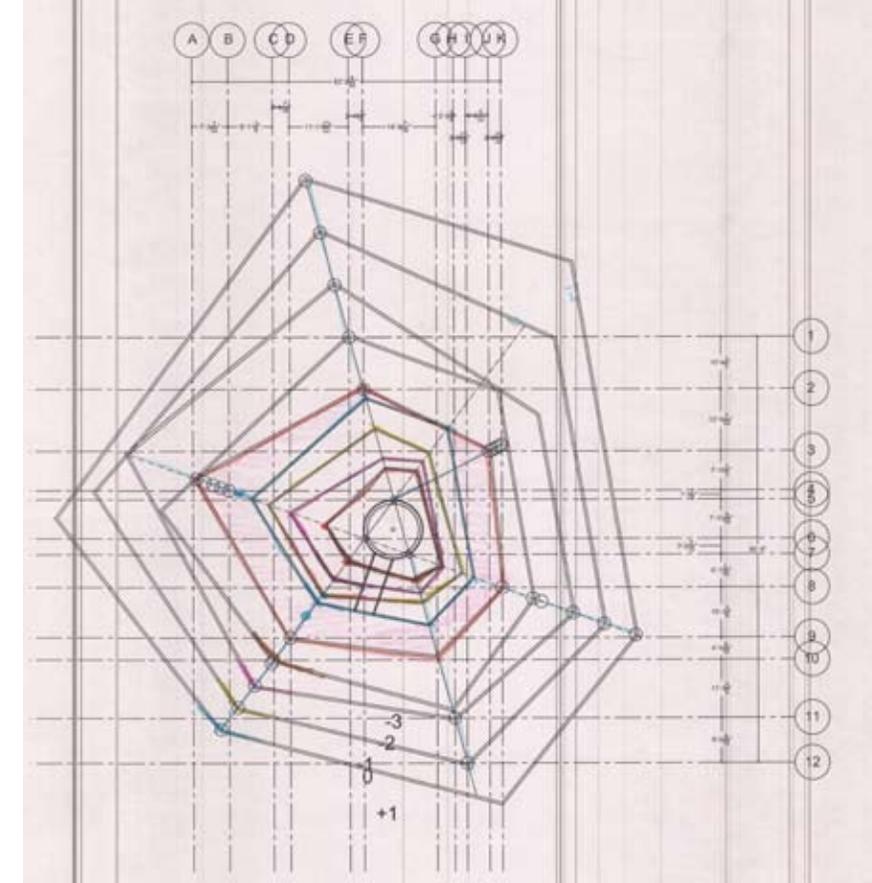
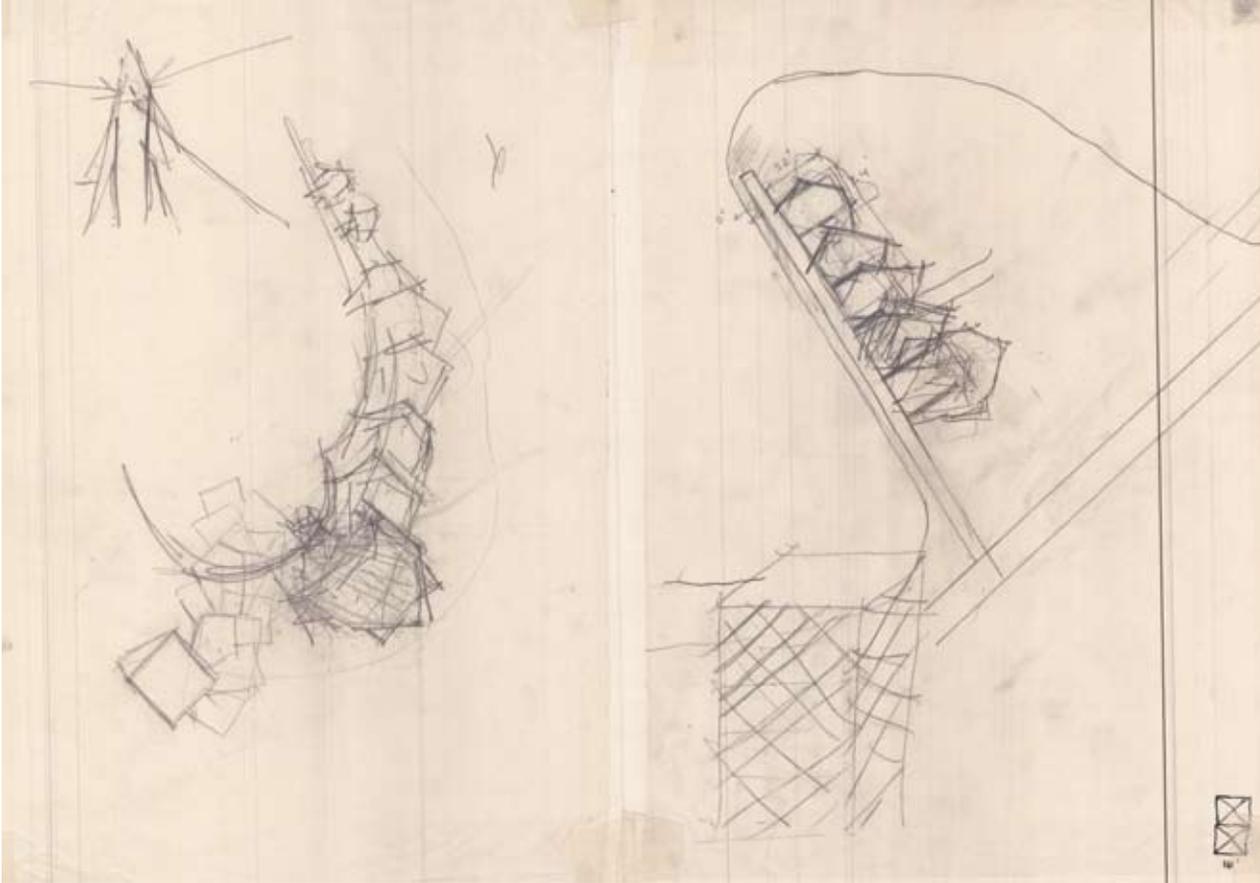


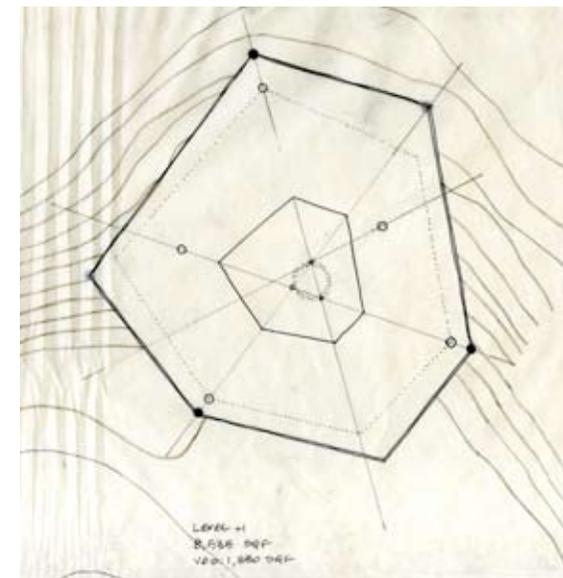
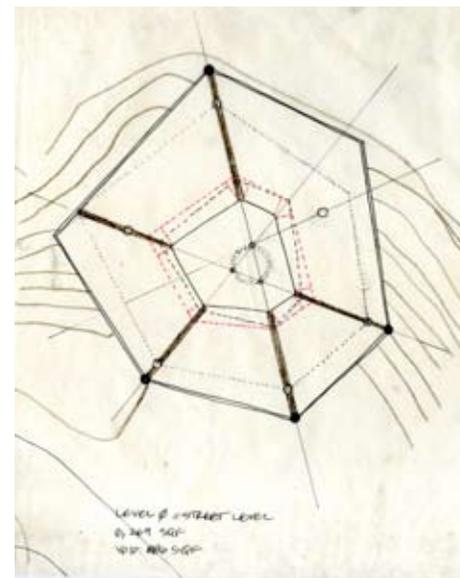
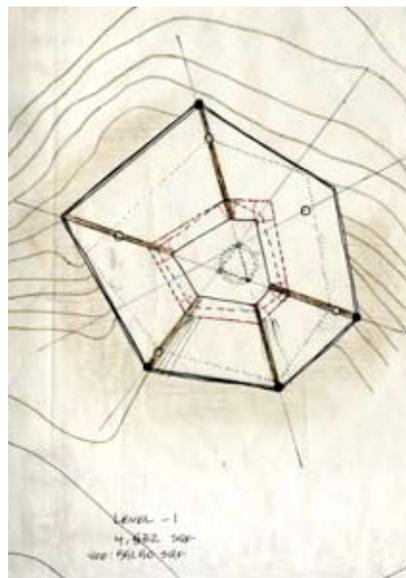
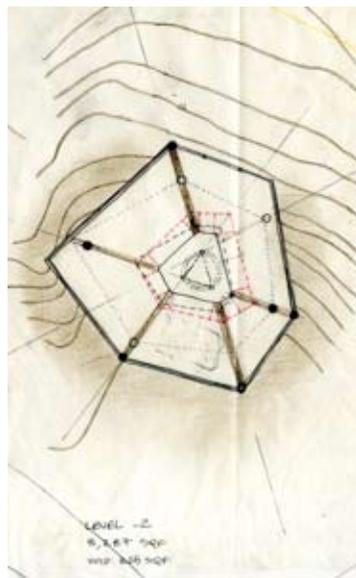
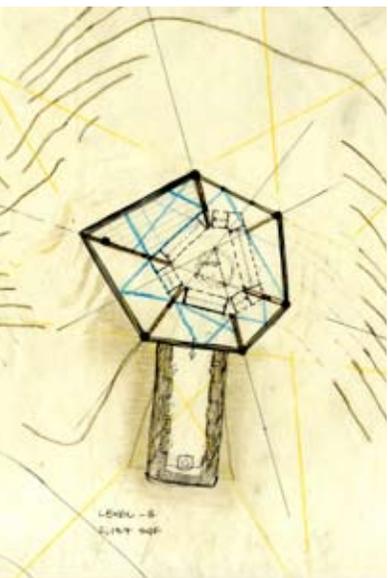
Architectural Material Study Drawing



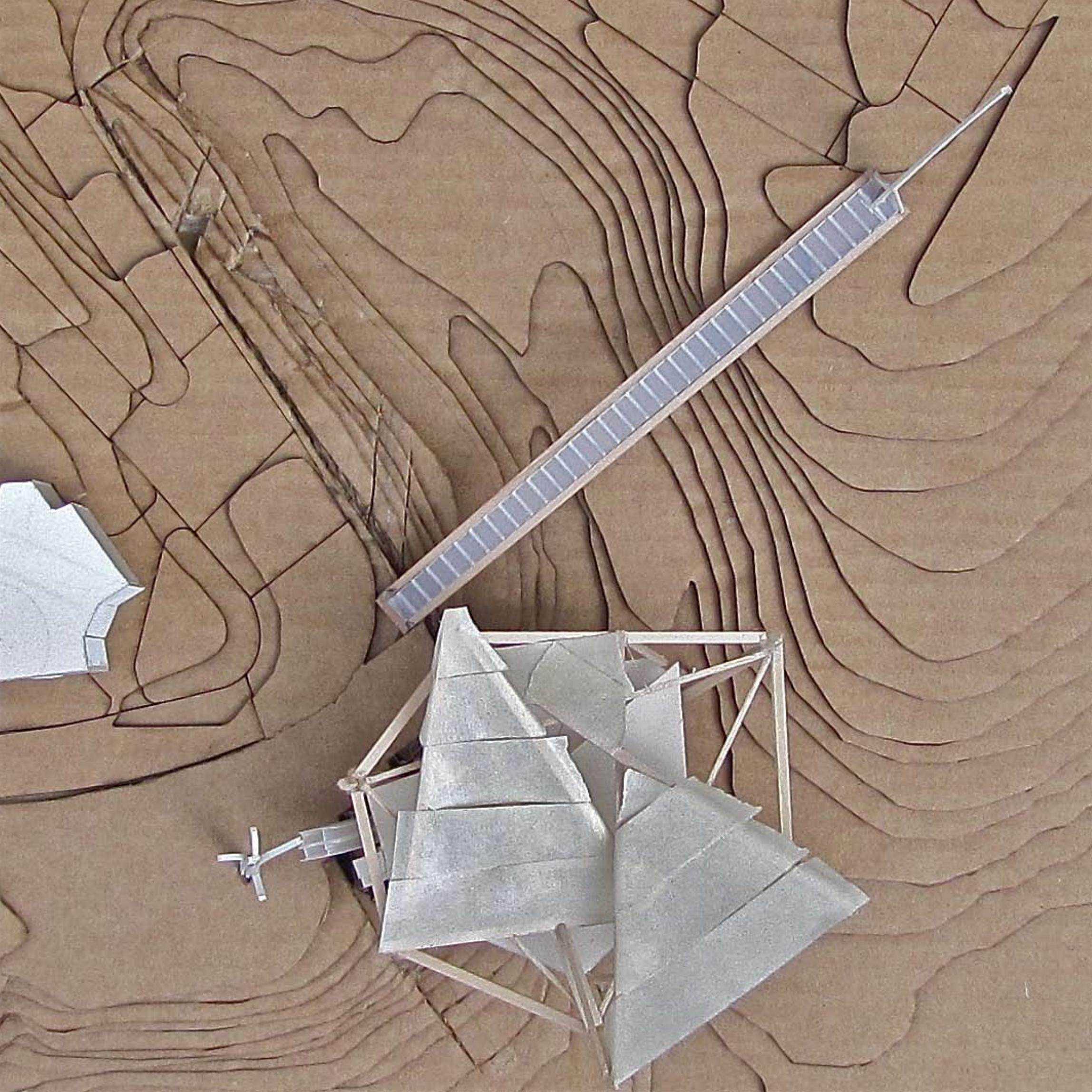
Study Model





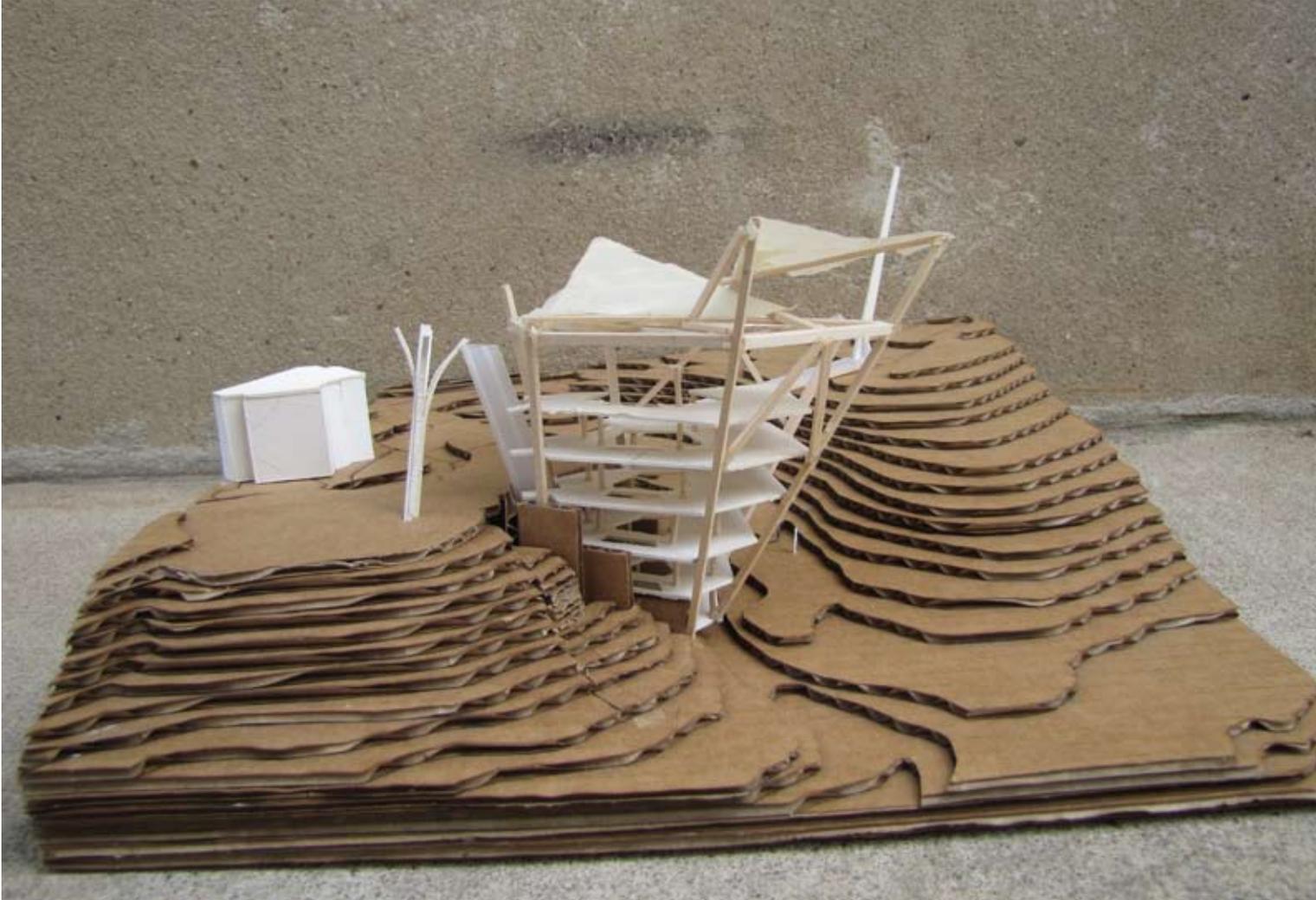


Soil conditions of the site

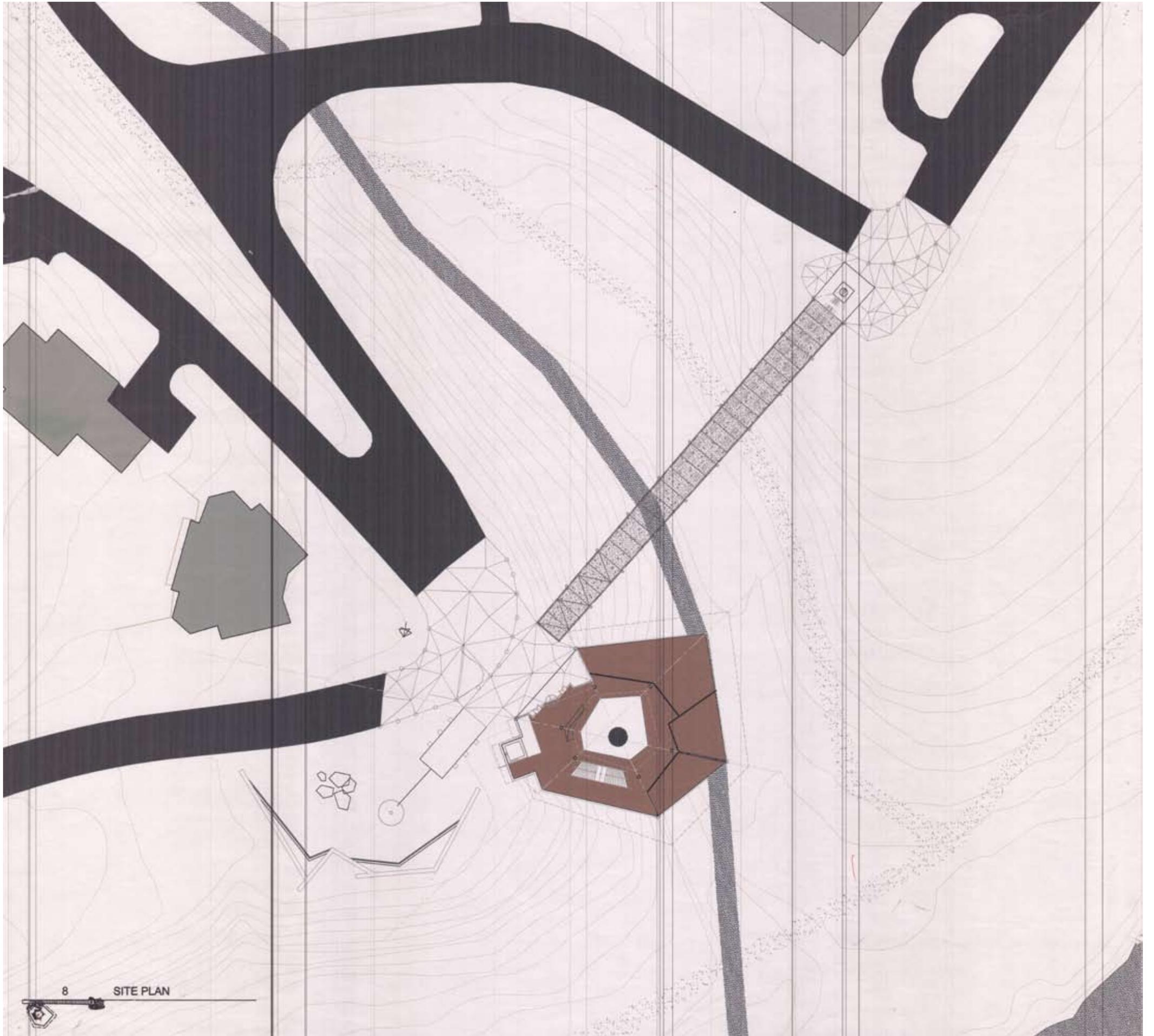


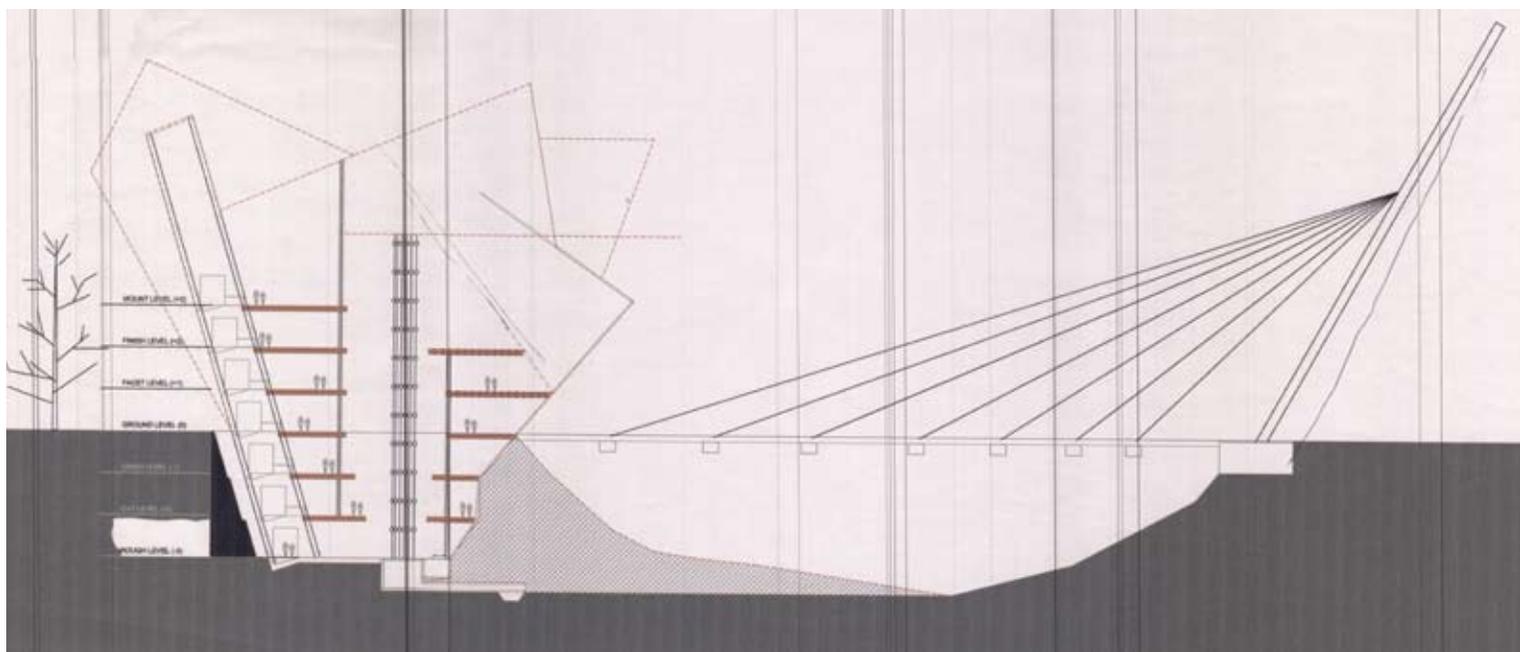
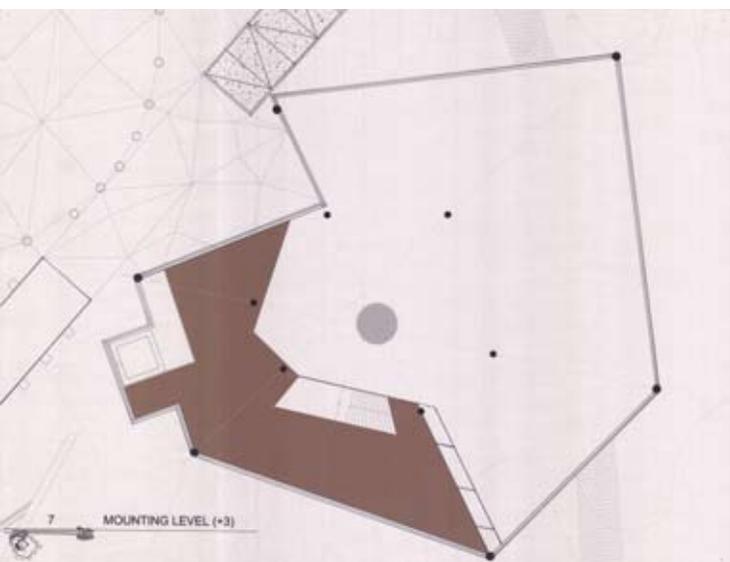
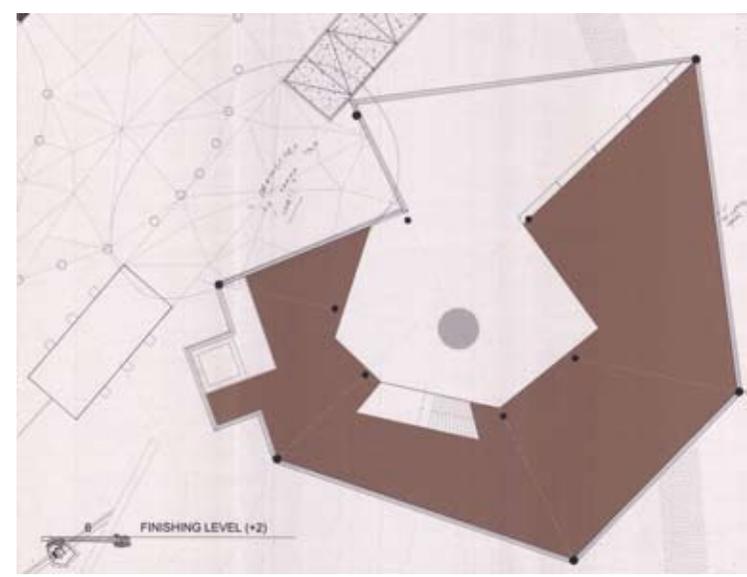
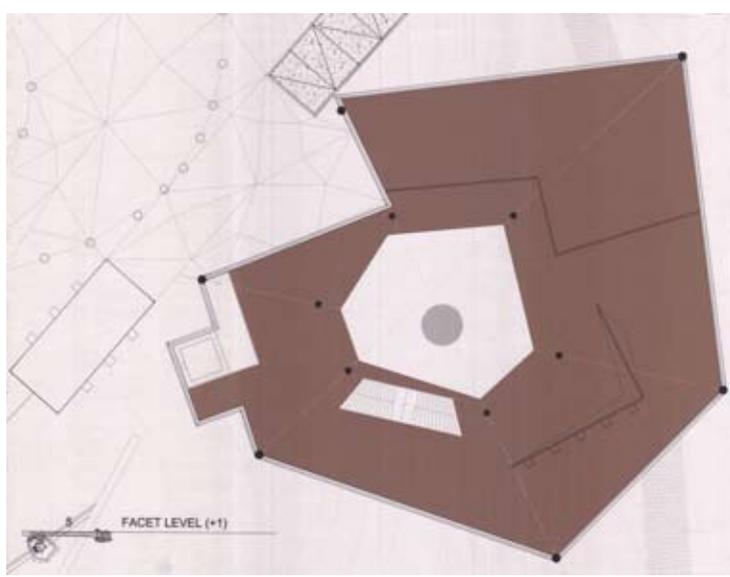
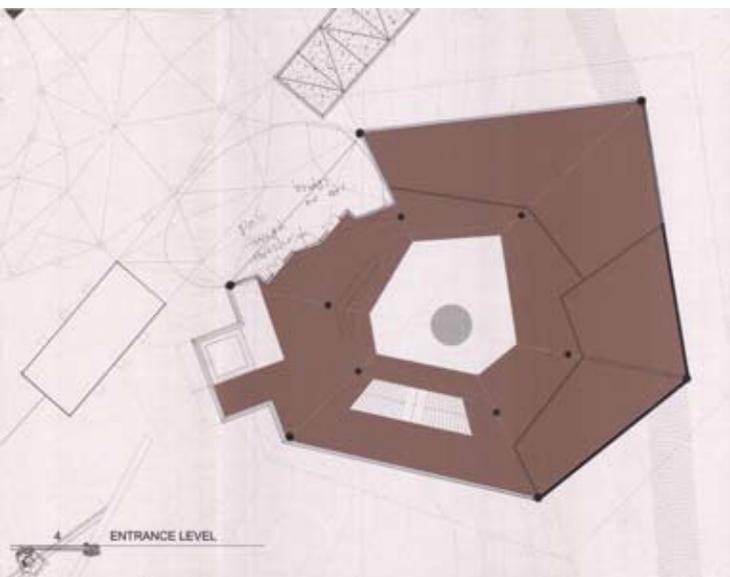
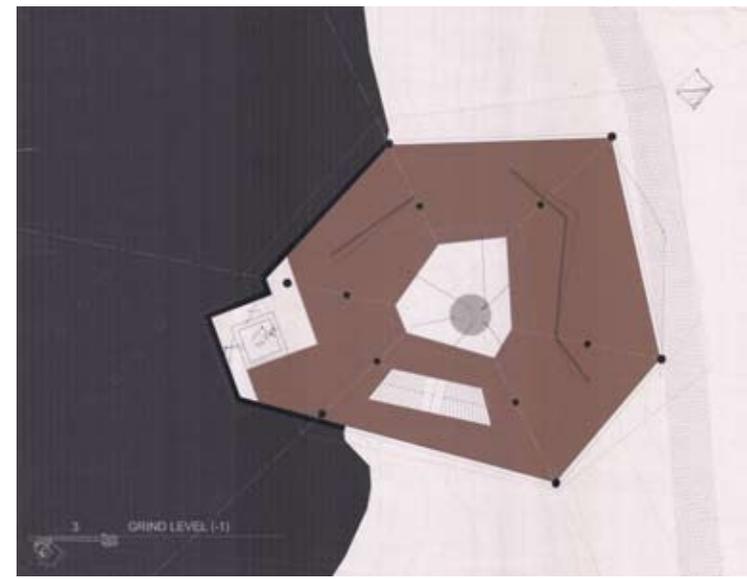
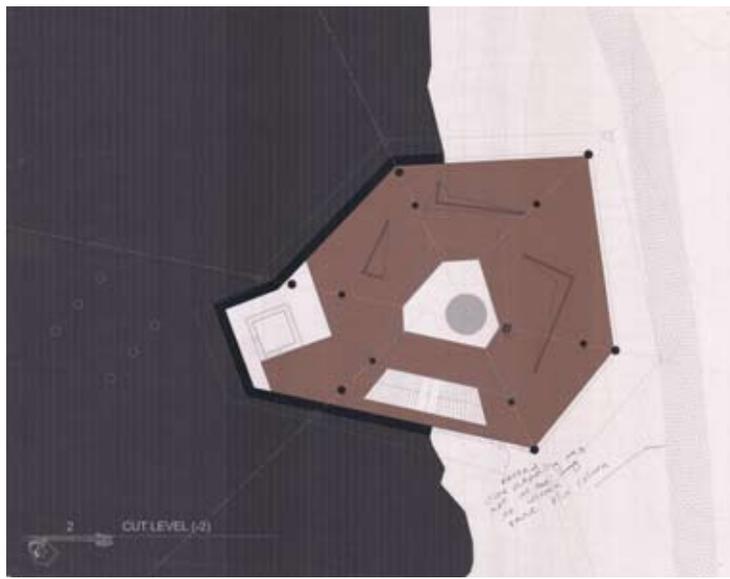
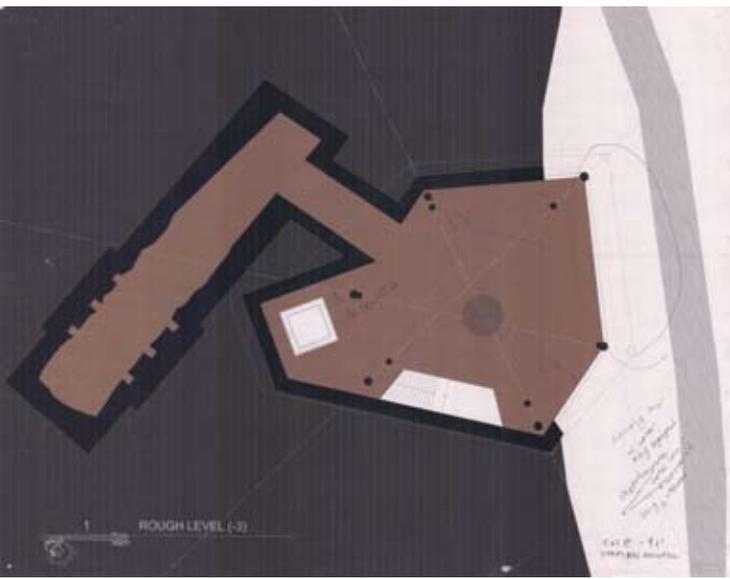


Study Model - View from North

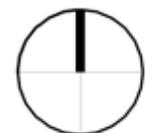


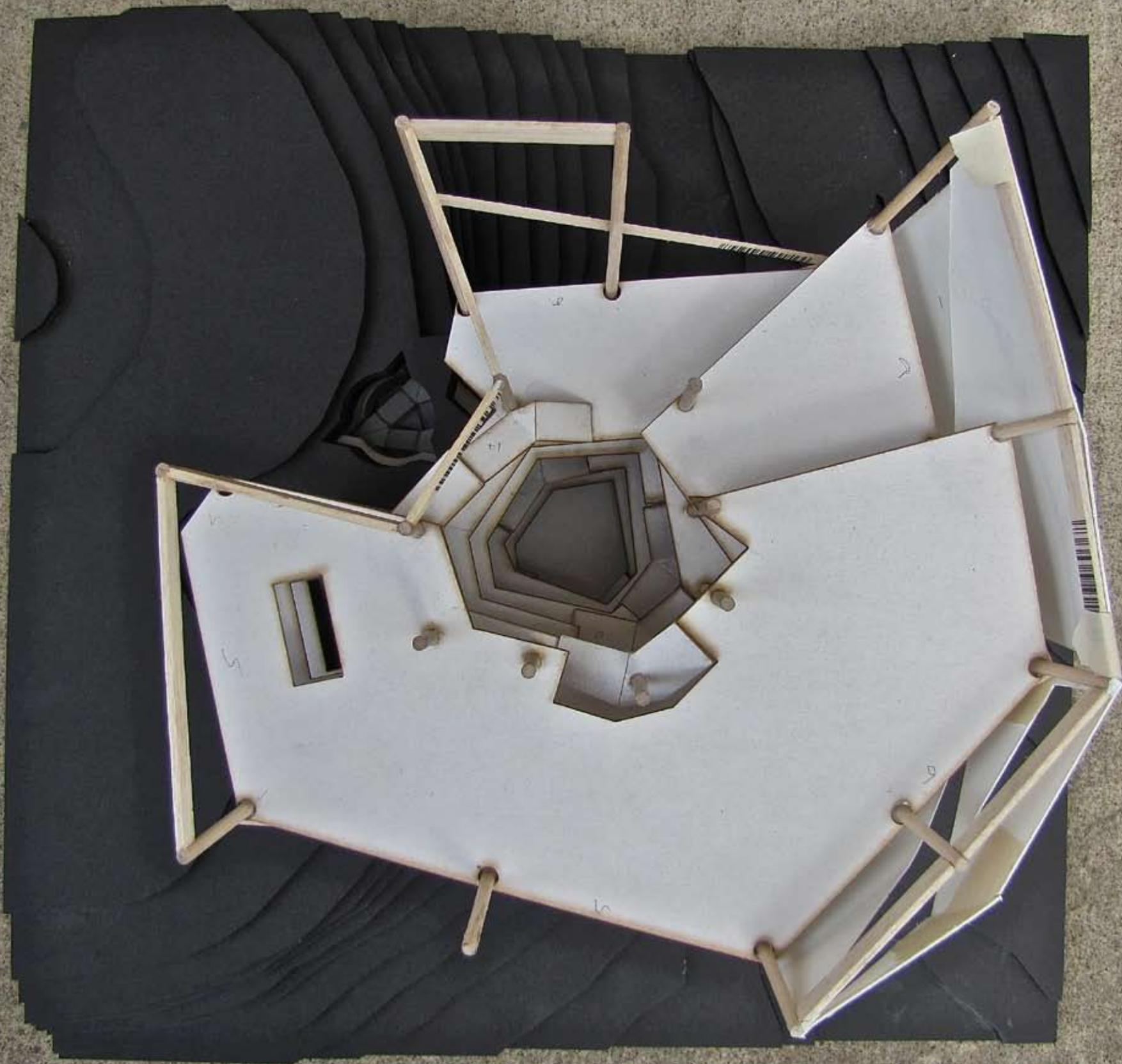
Study Model - View from South East





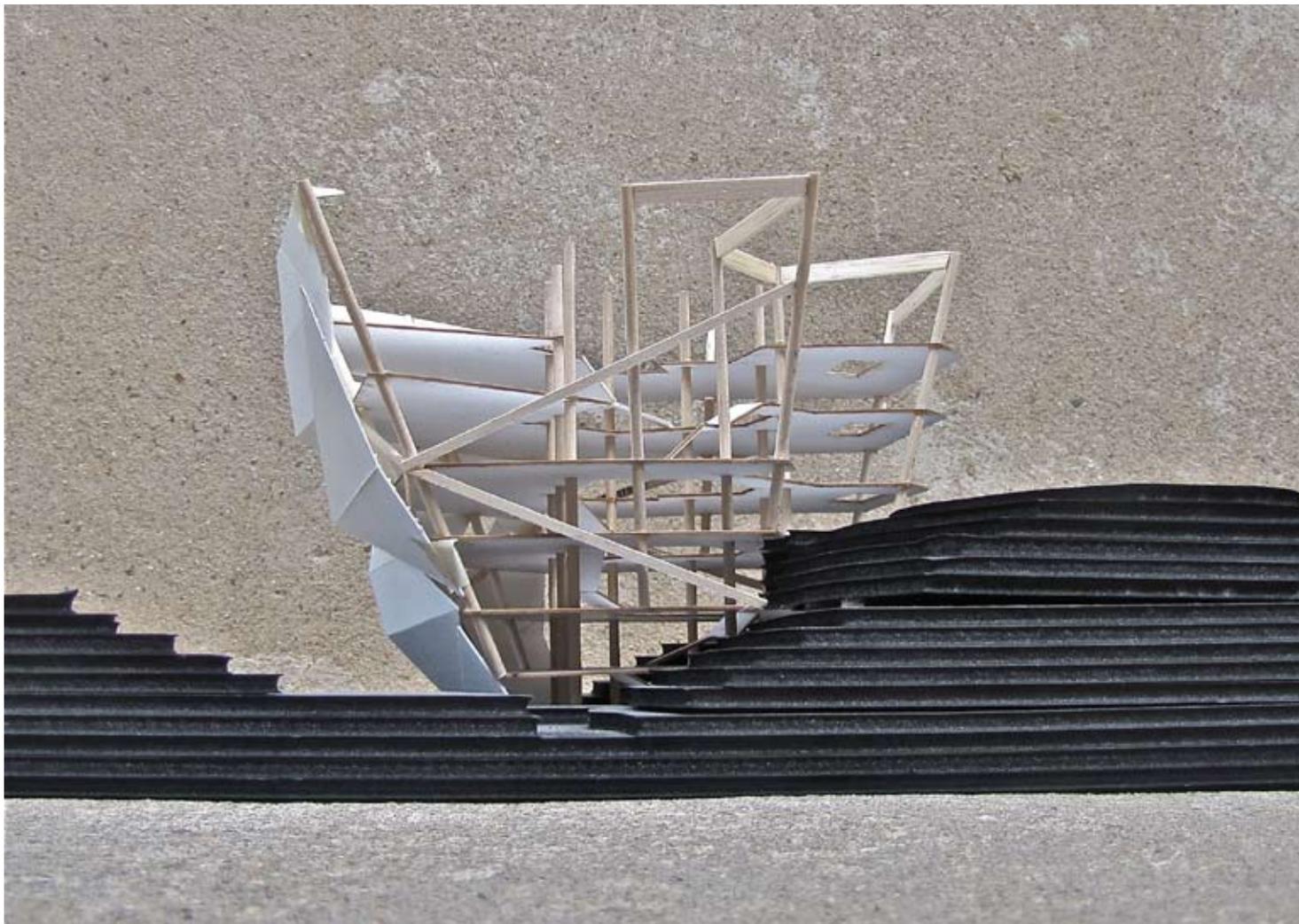
1" = 40'-0"



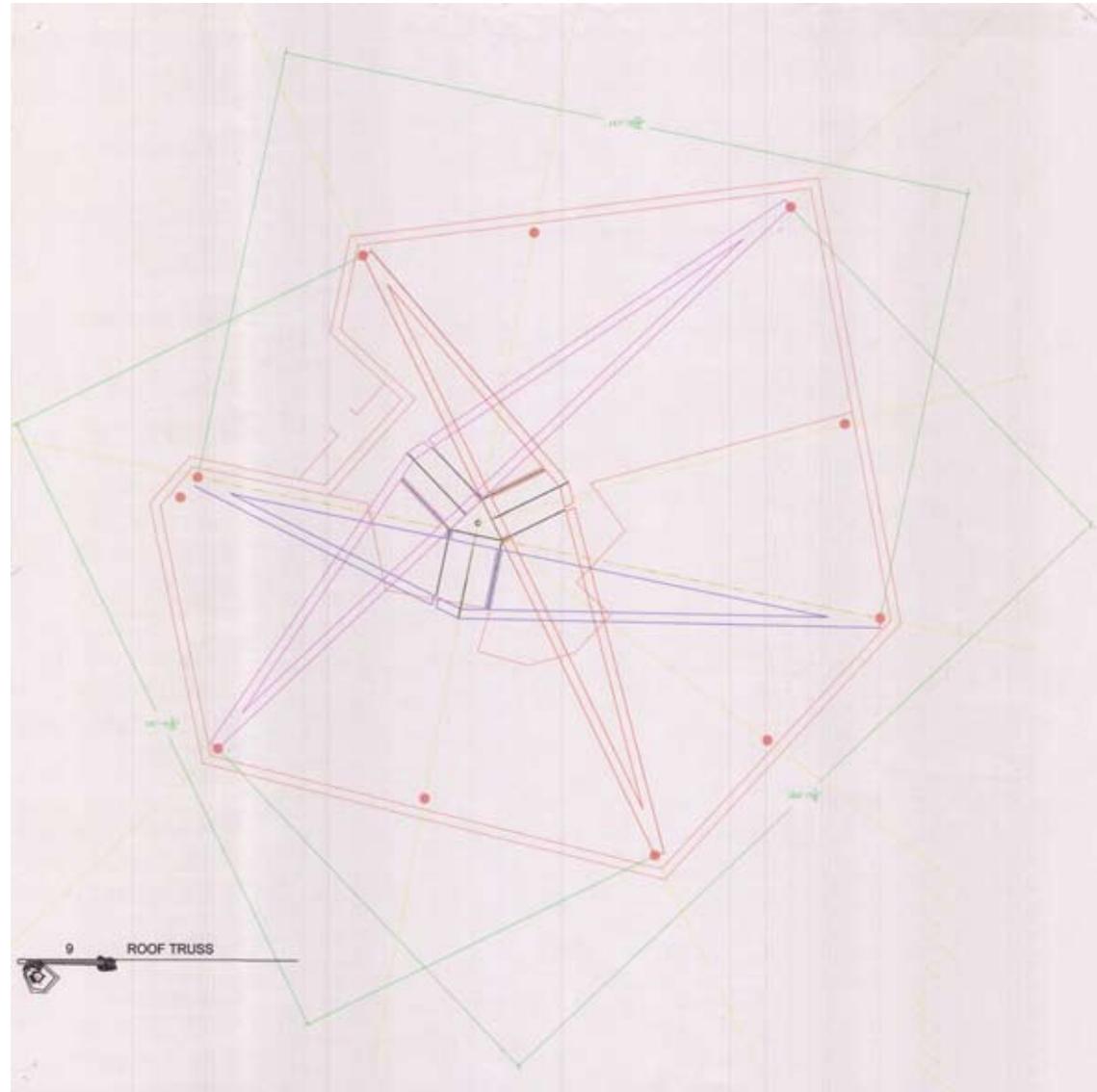
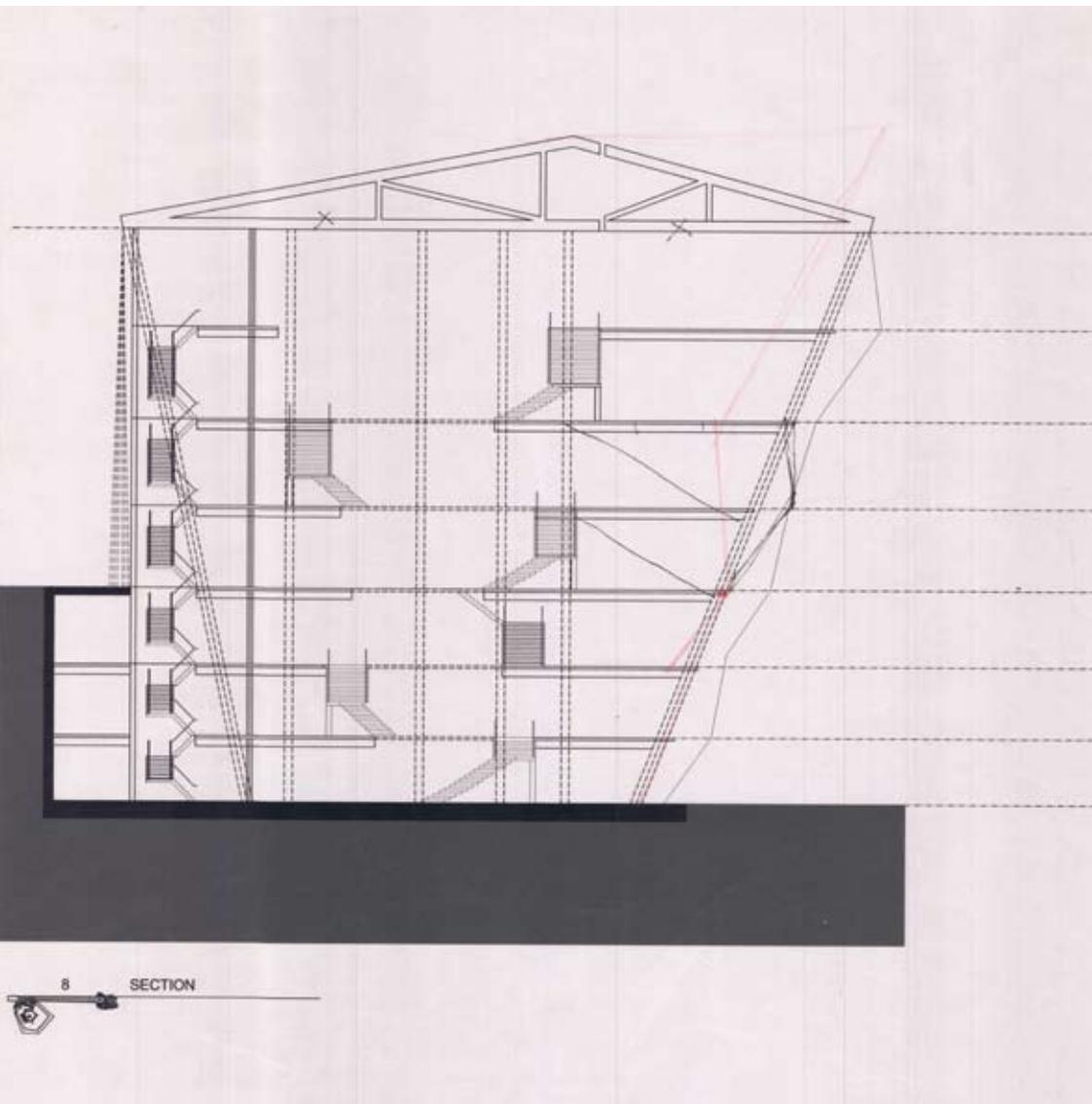


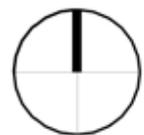
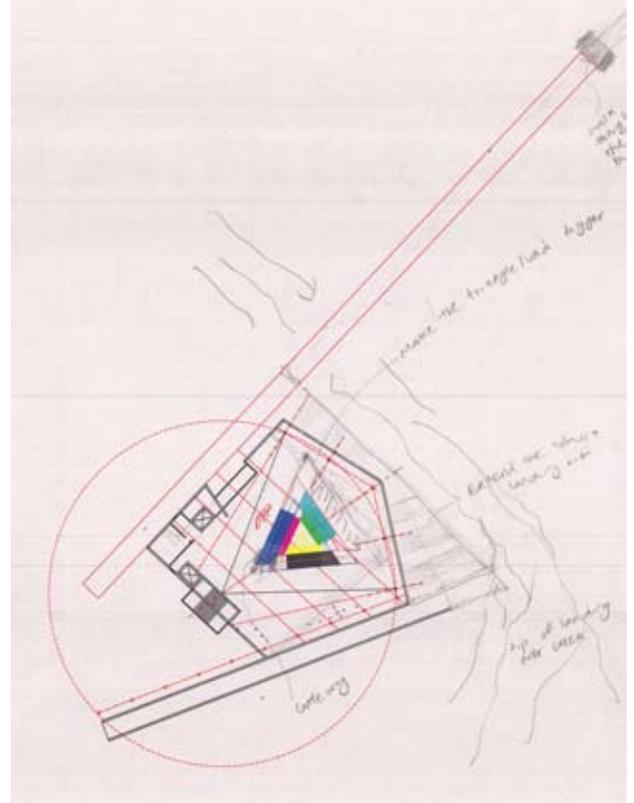
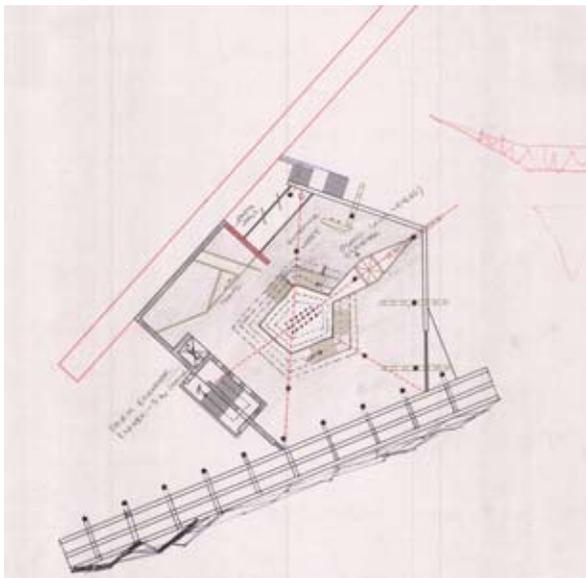
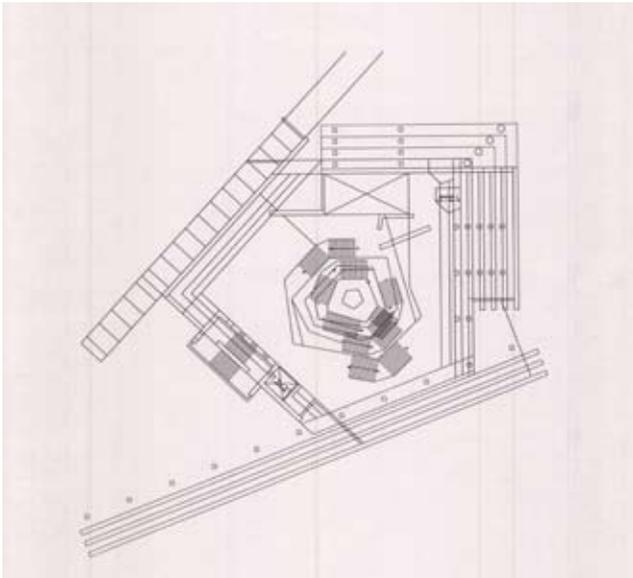
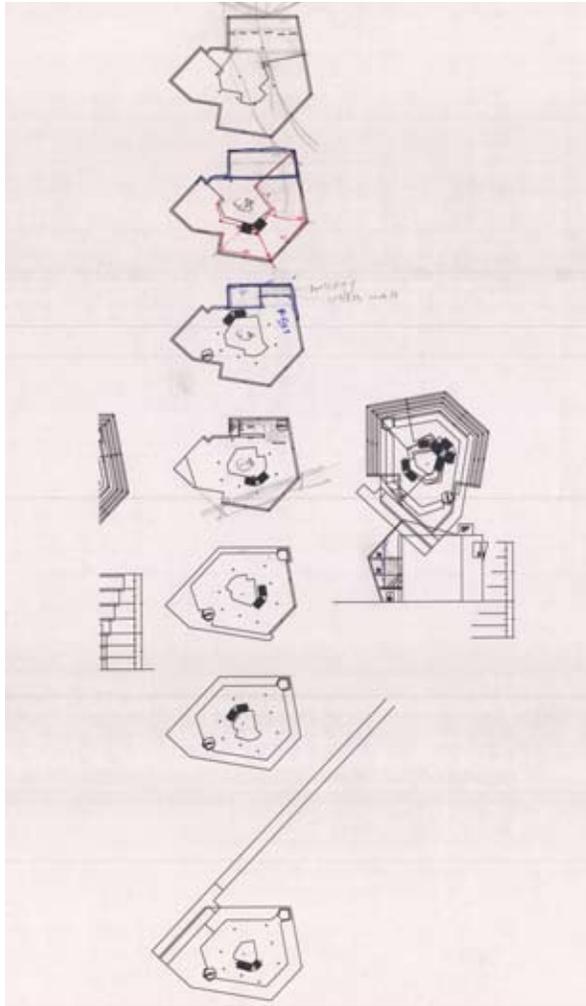
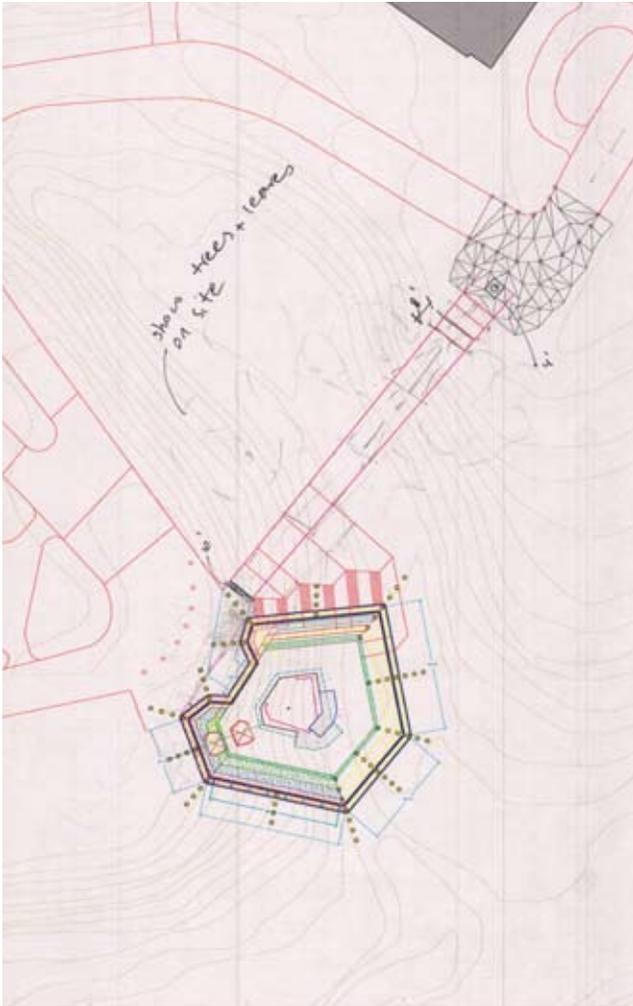


Study Model - View from South

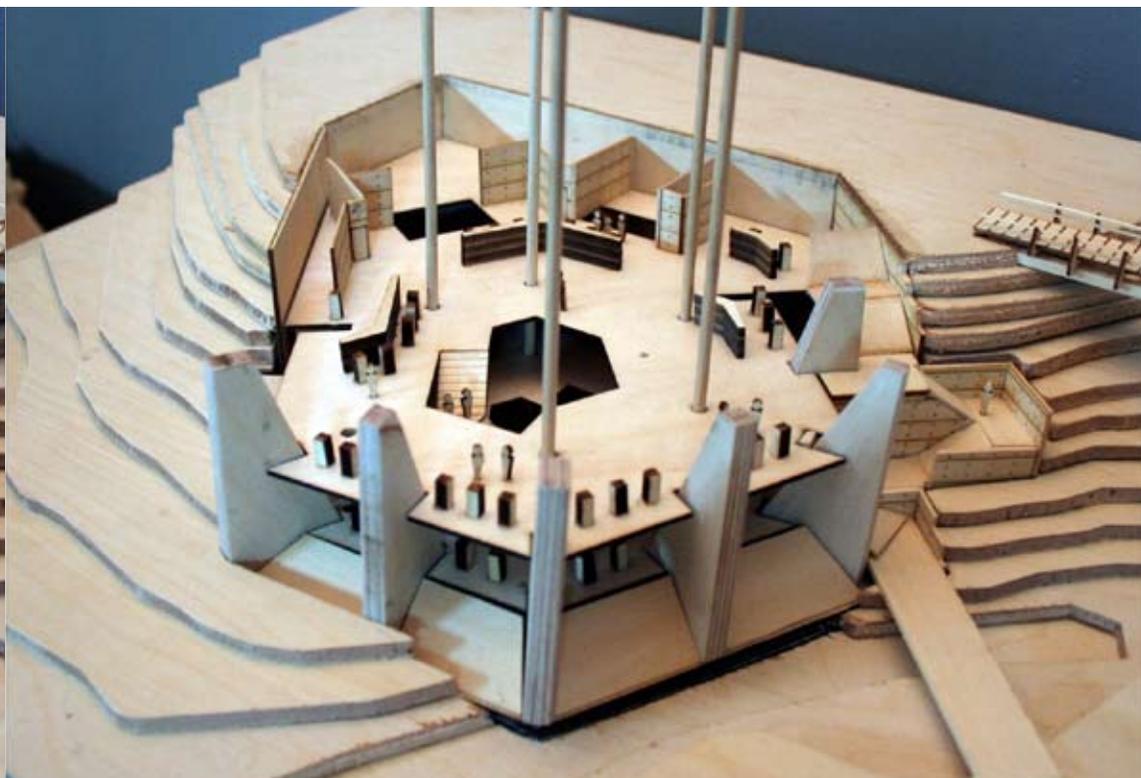
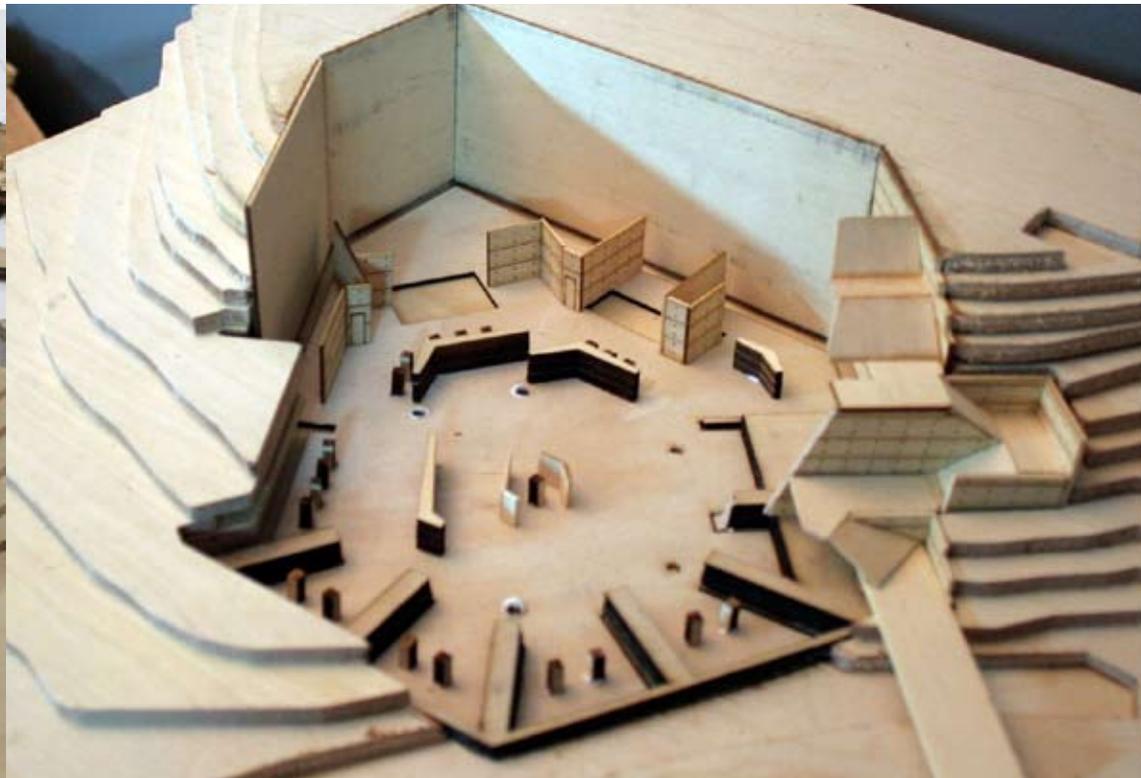


Study Model - View from North

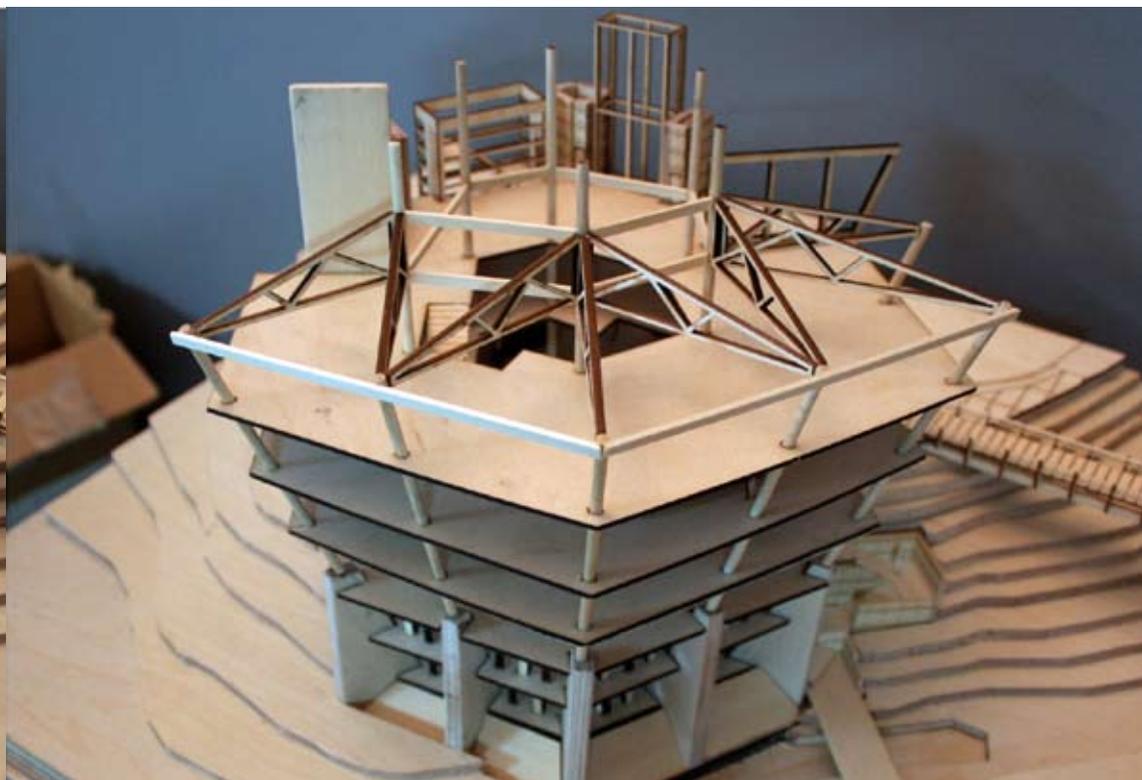
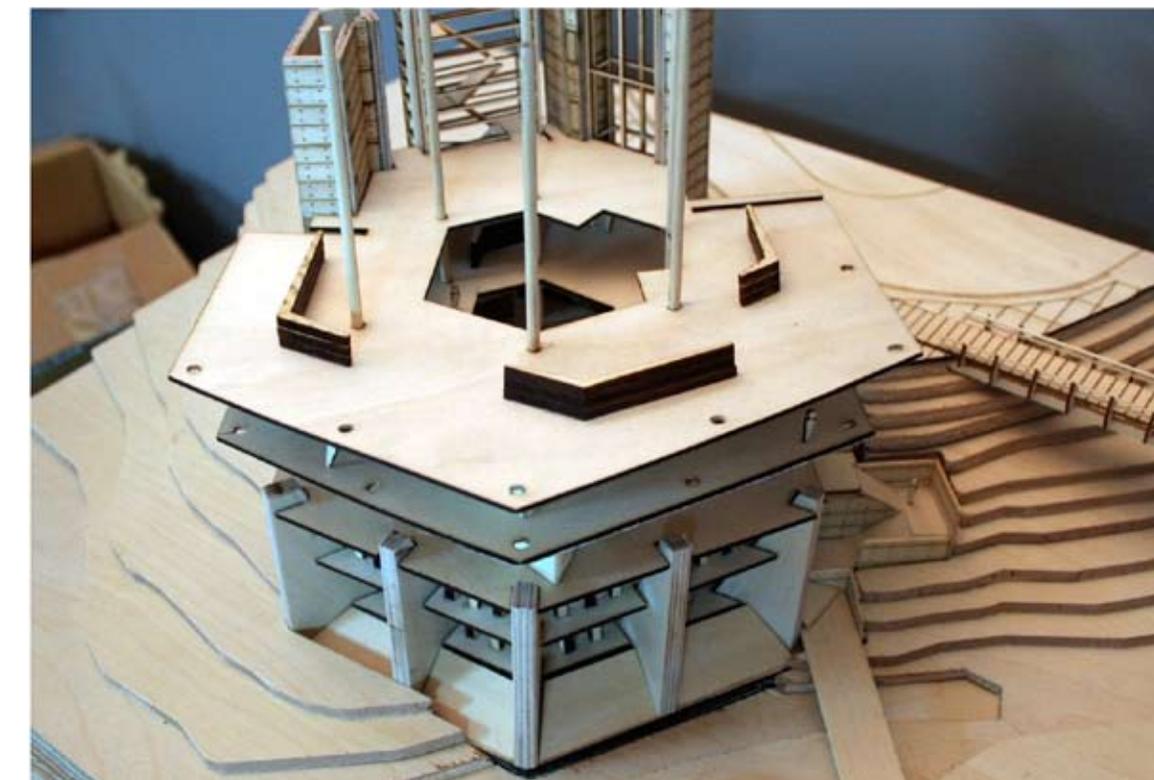
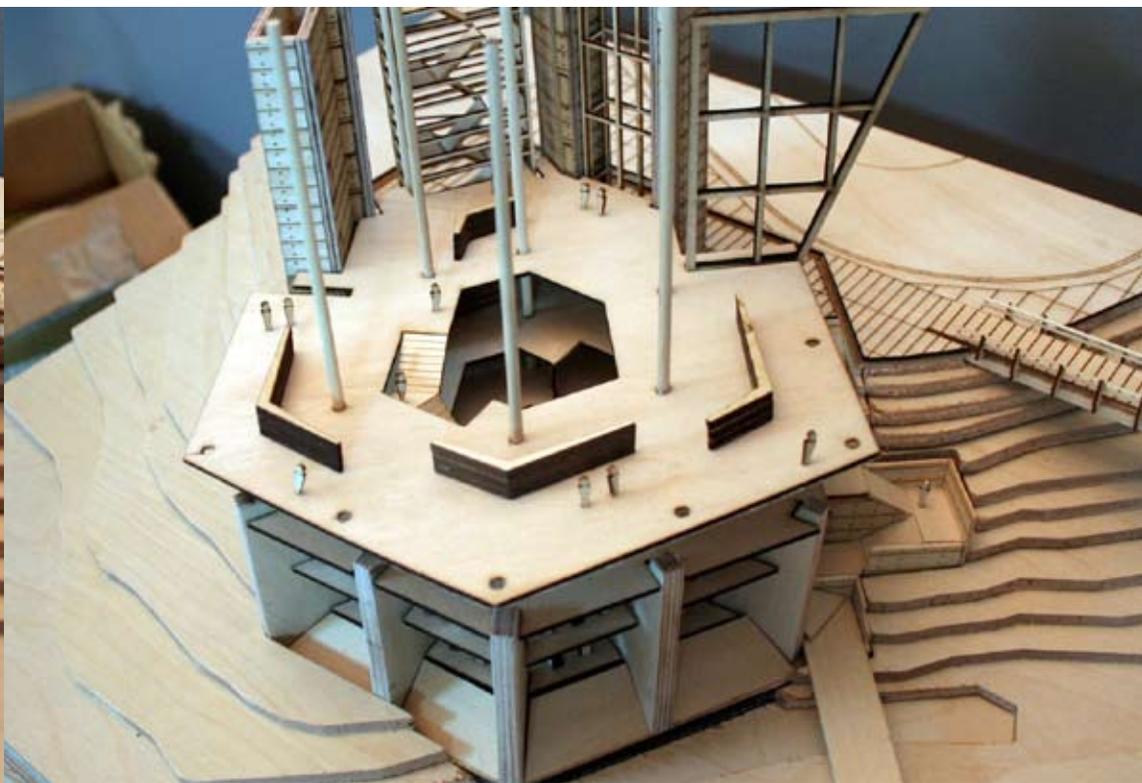
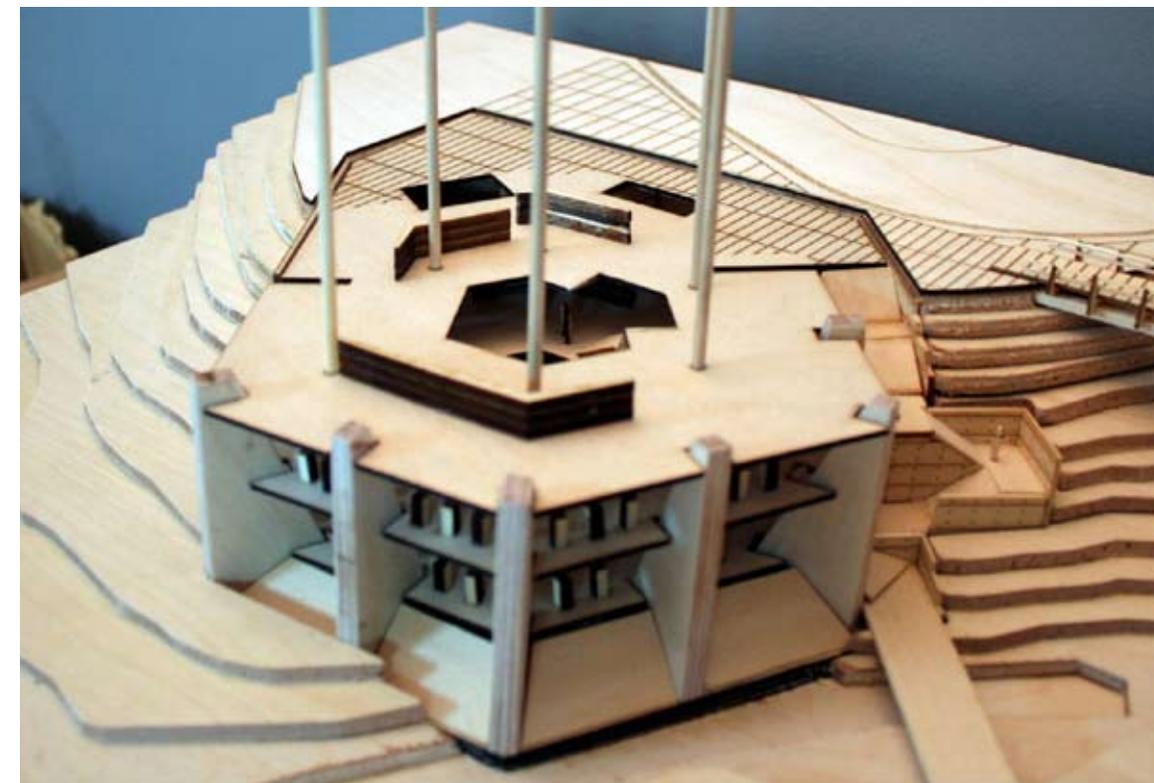


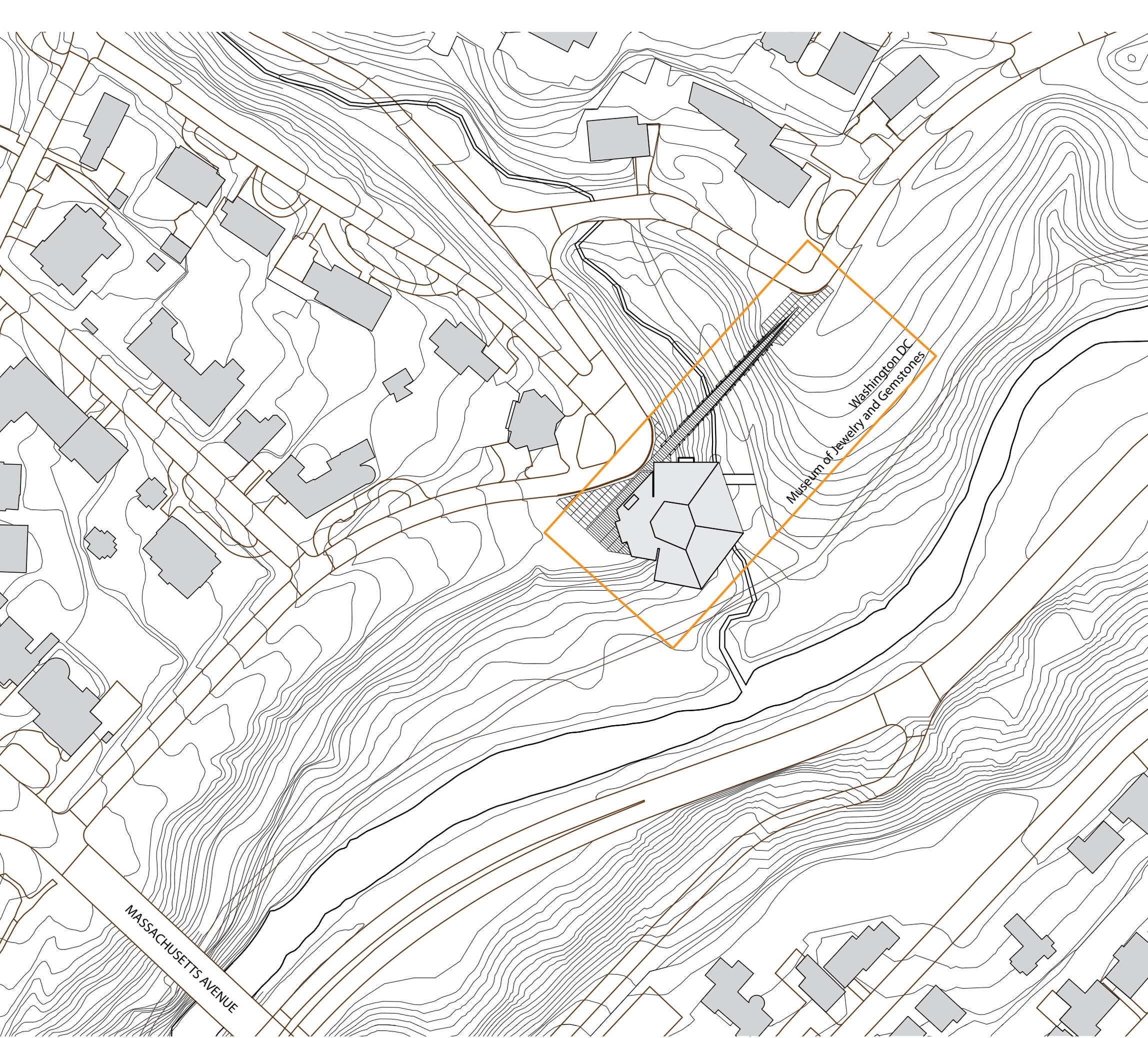


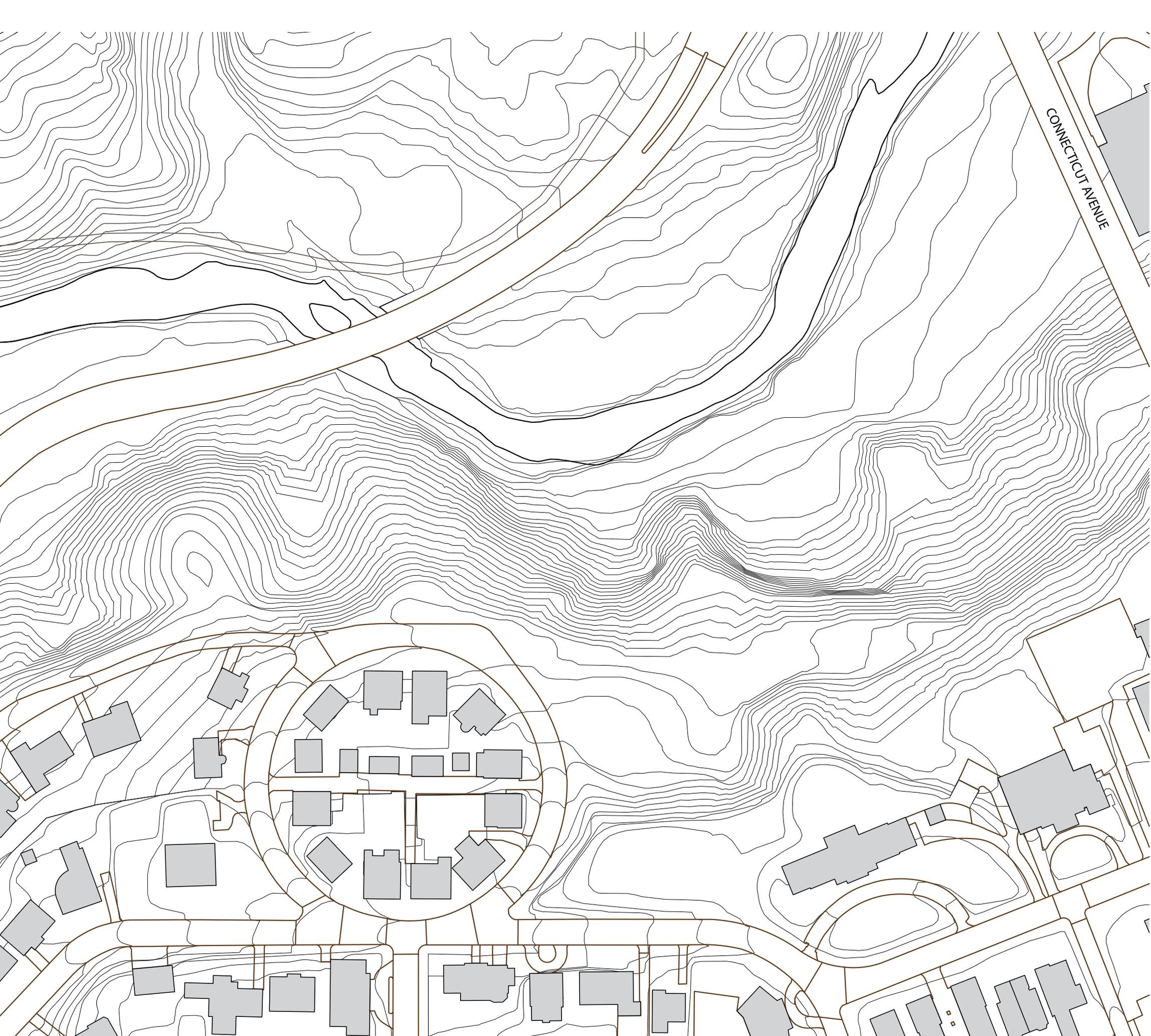
final design



50 Final Design - Gem cutting the final model

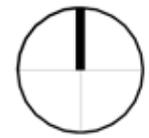


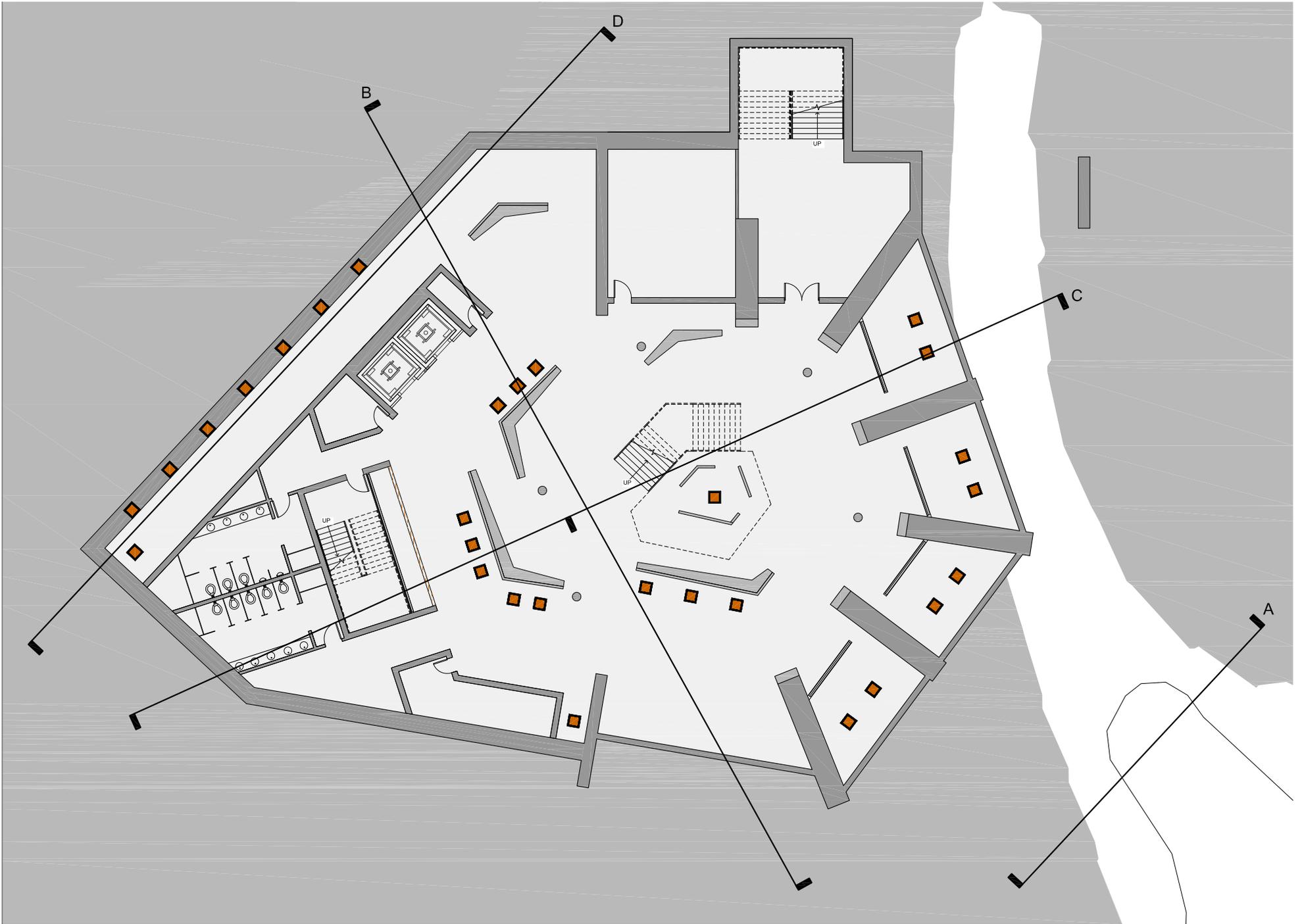




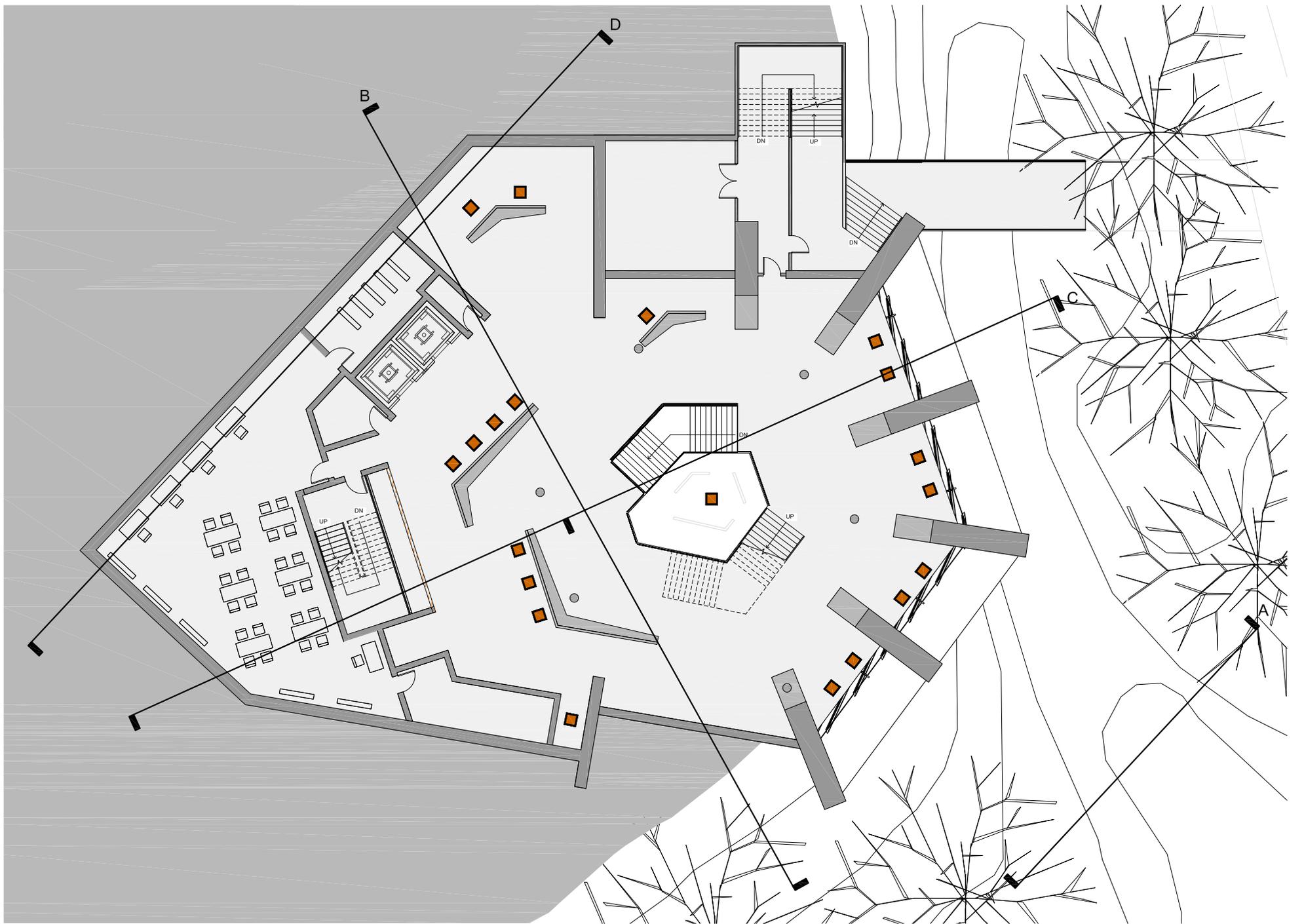
CONNECTICUT AVENUE

1" = 125'-0"





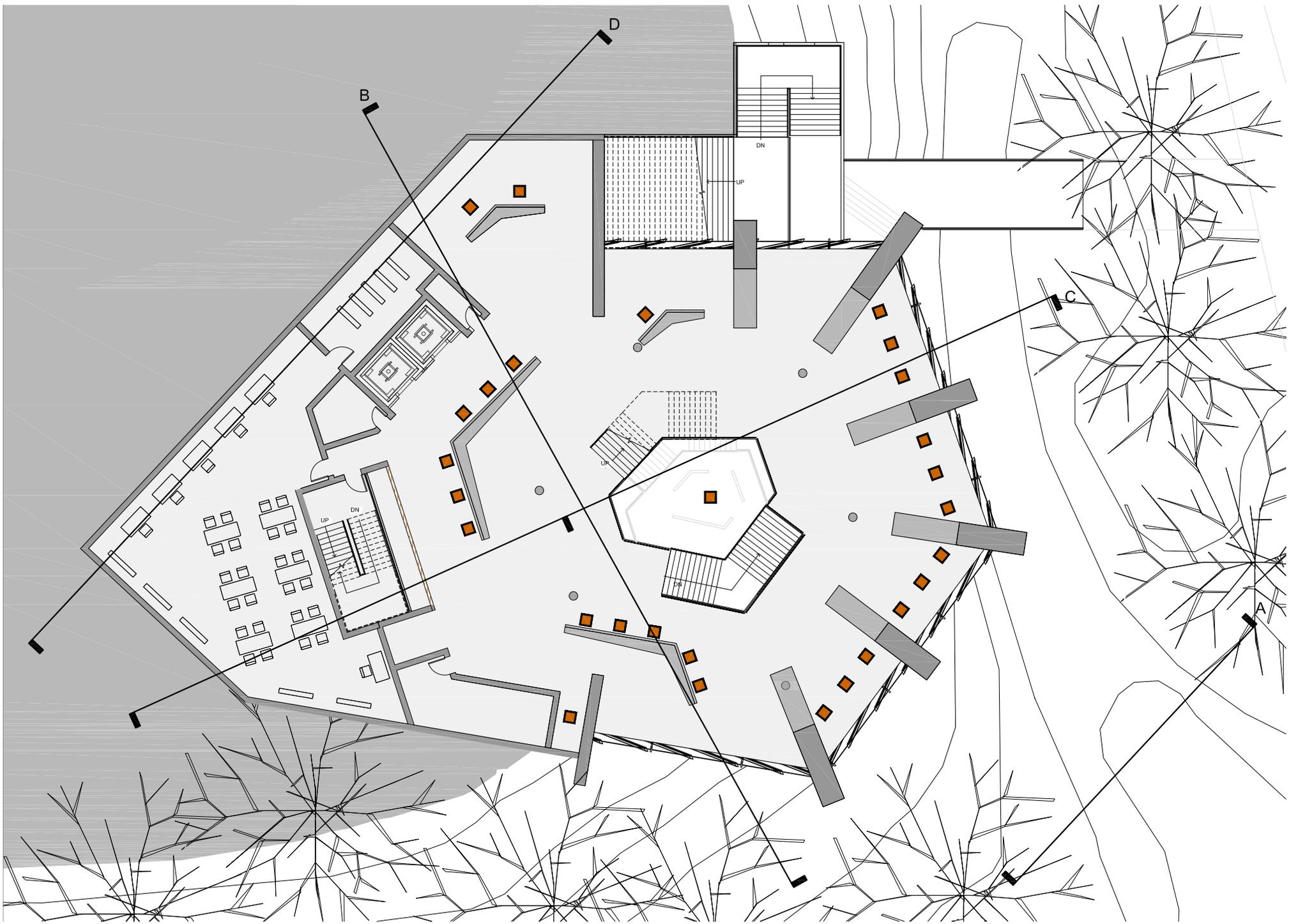
Floor Plan - Excavation Level -3



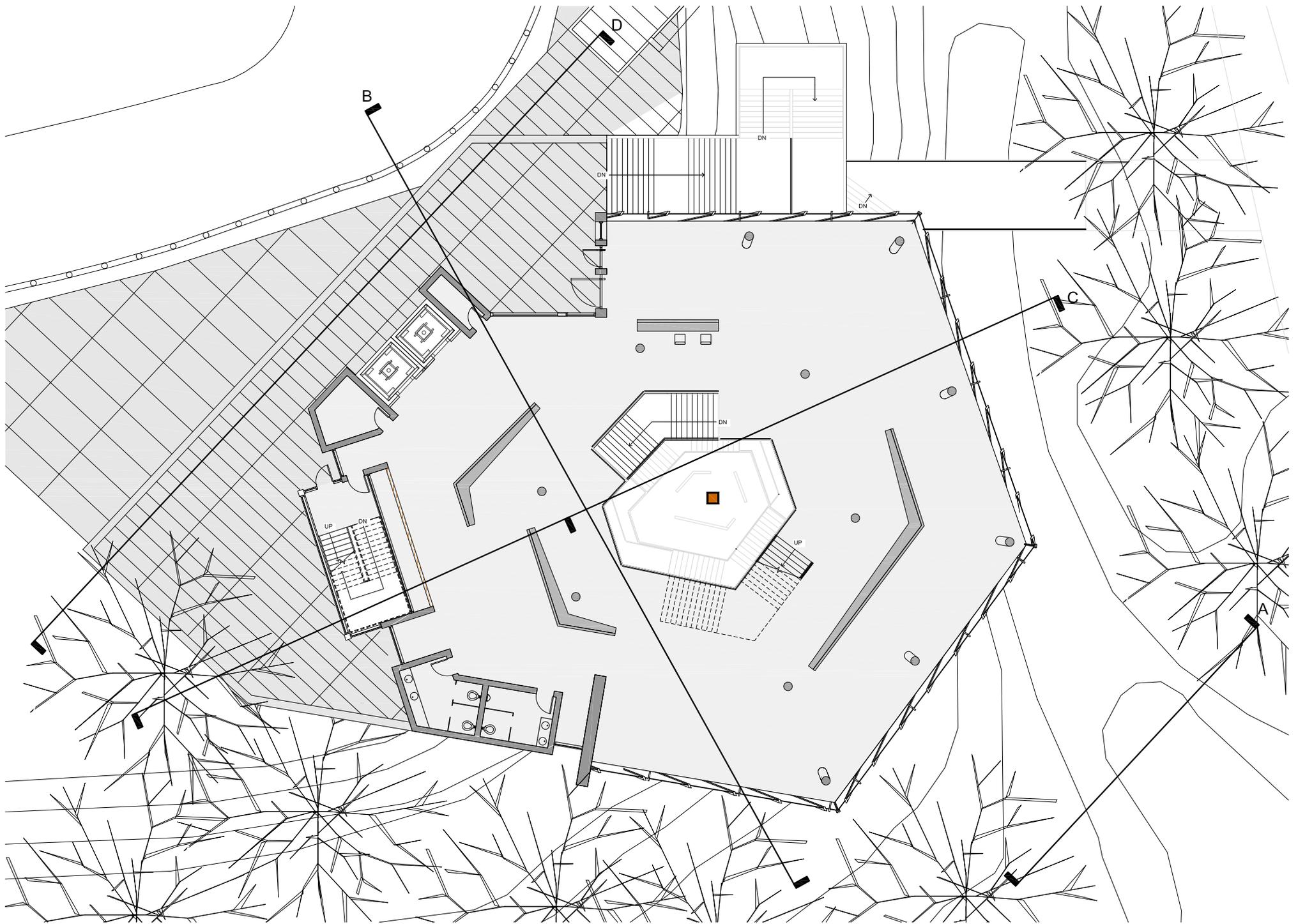
Floor Plan - Cut Level -2

1" = 16'-0"



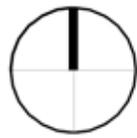


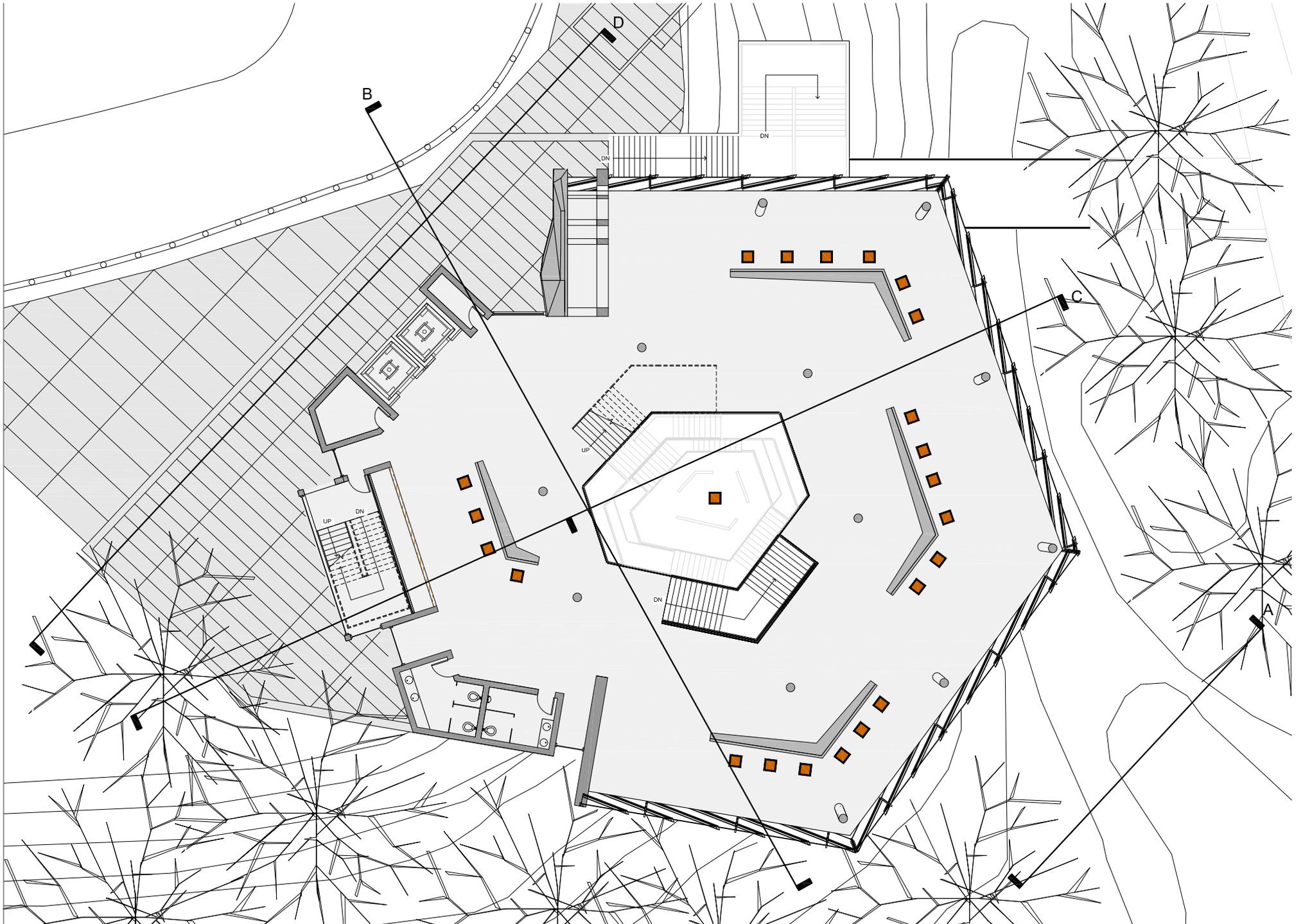
Floor Plan - Grind Level -1



Floor Plan - Ground Level 0

1" = 16'-0"





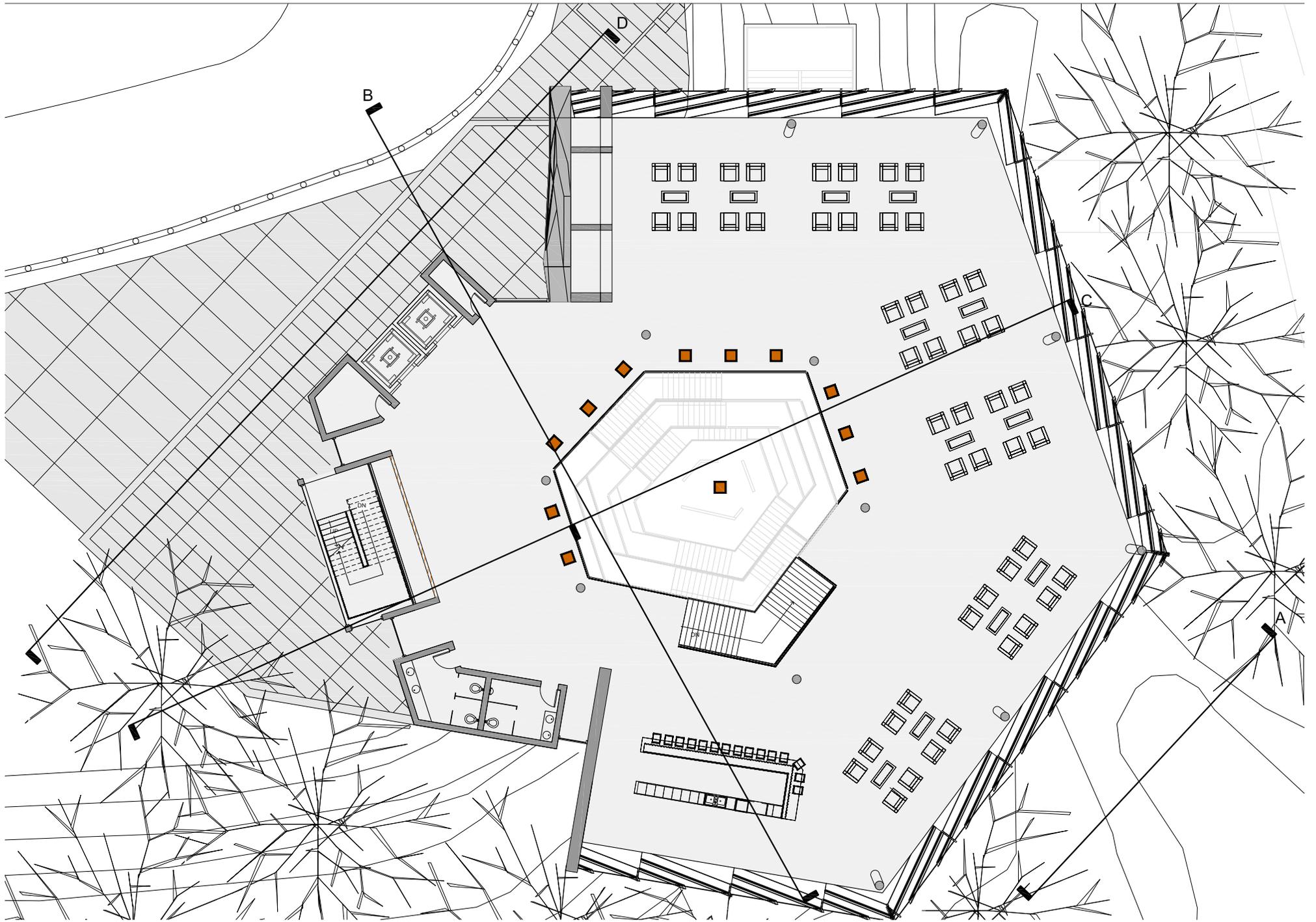
Floor Plan - Facet Level +1



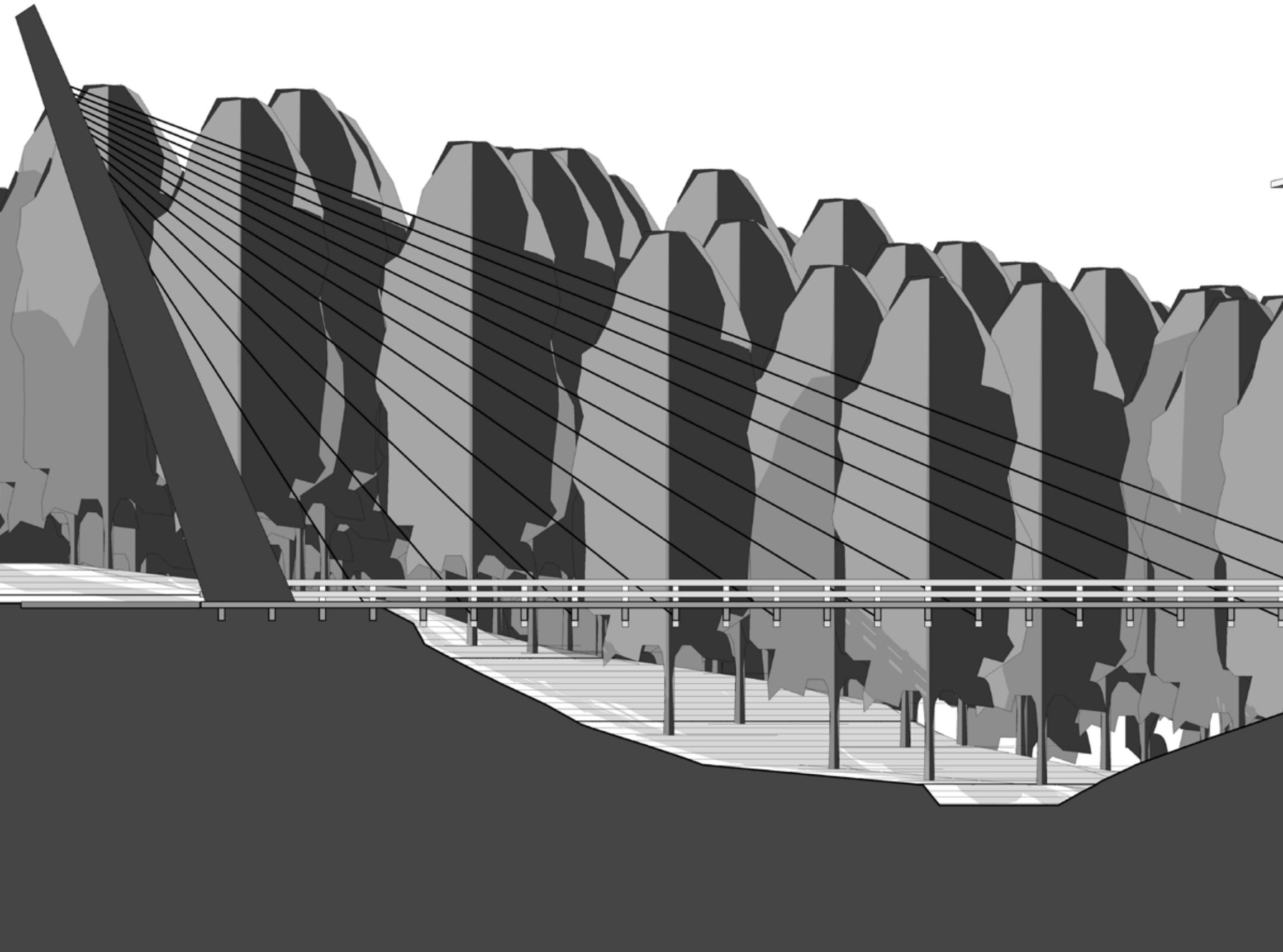
Floor Plan - Finish Level +2

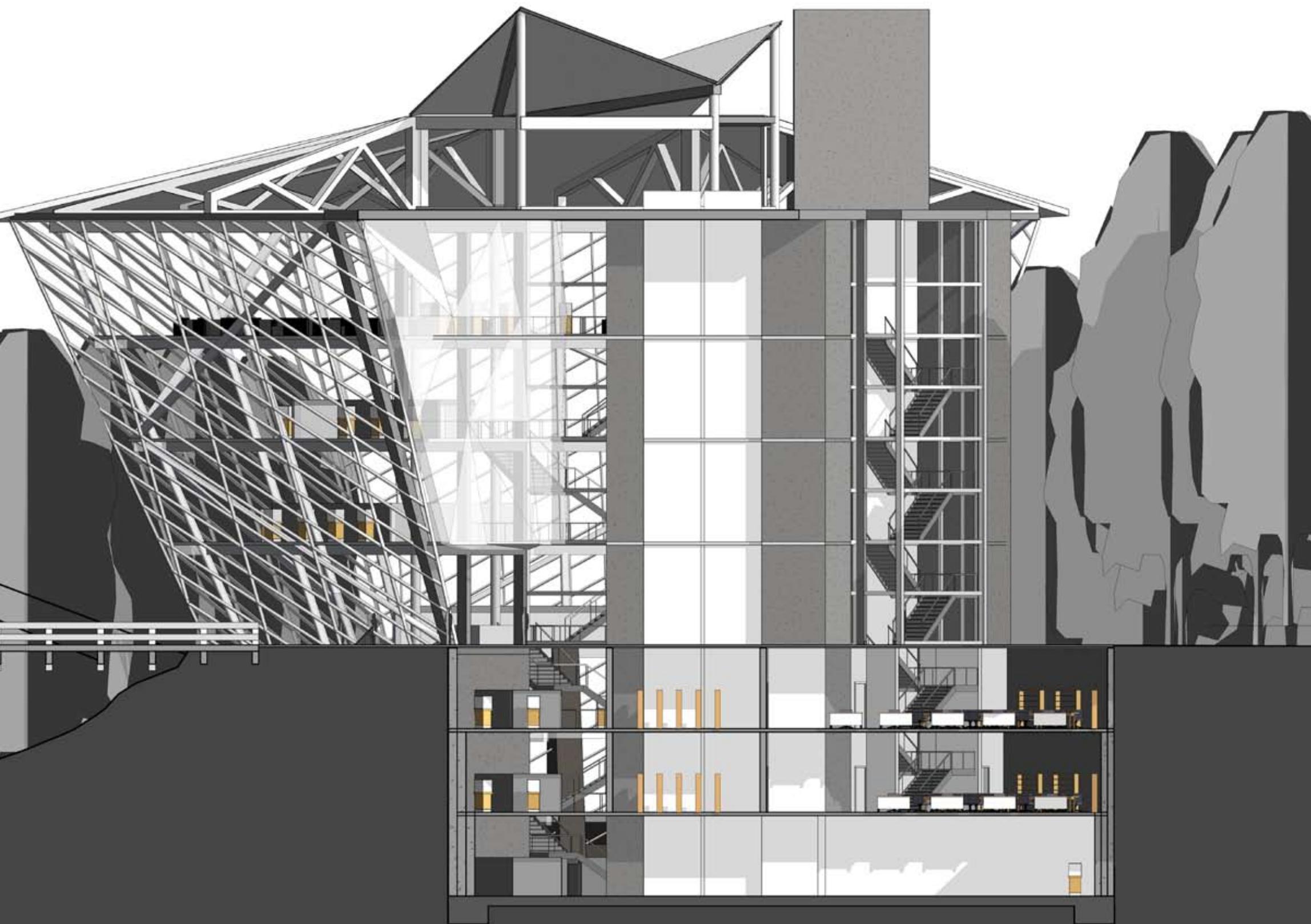
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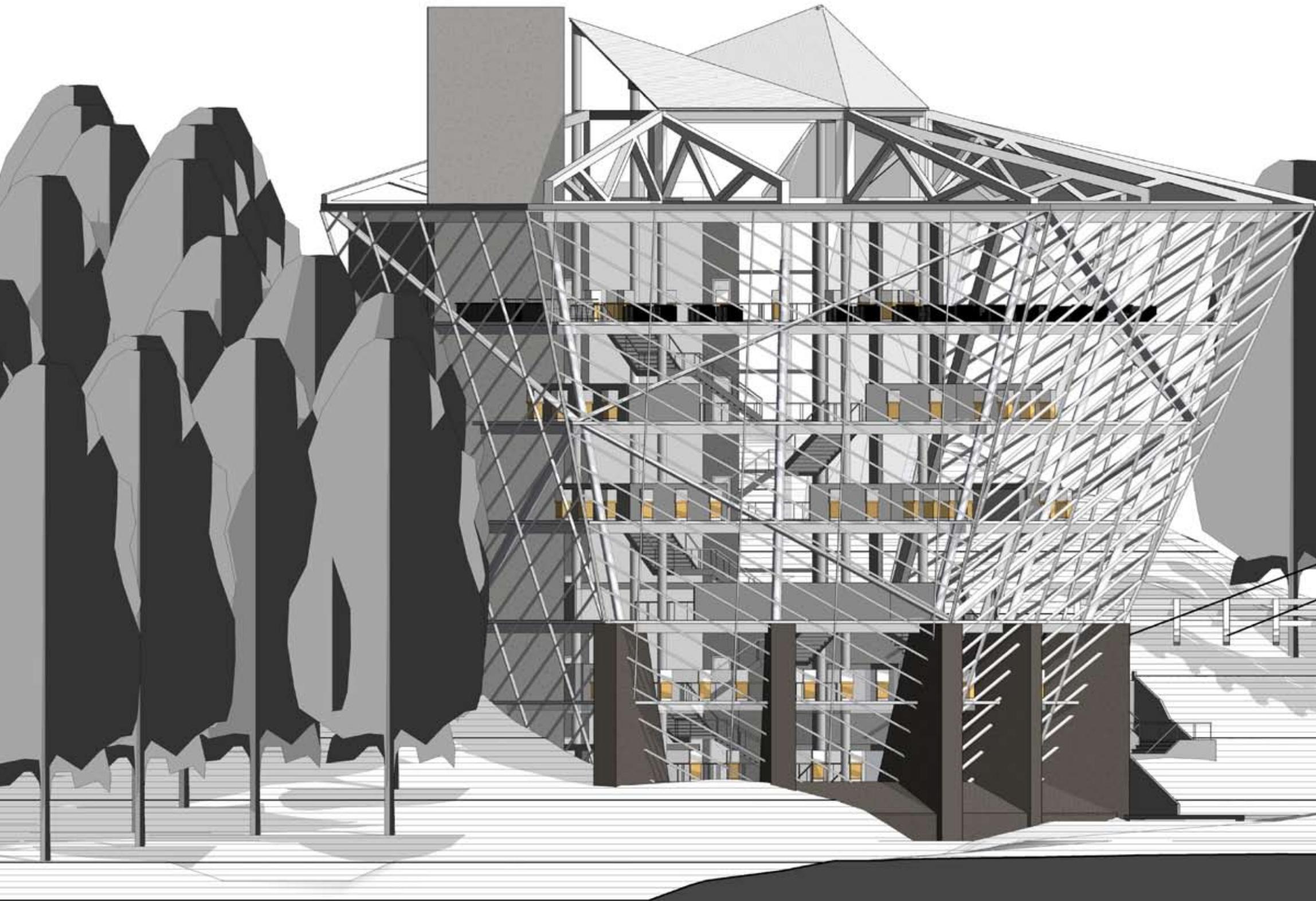


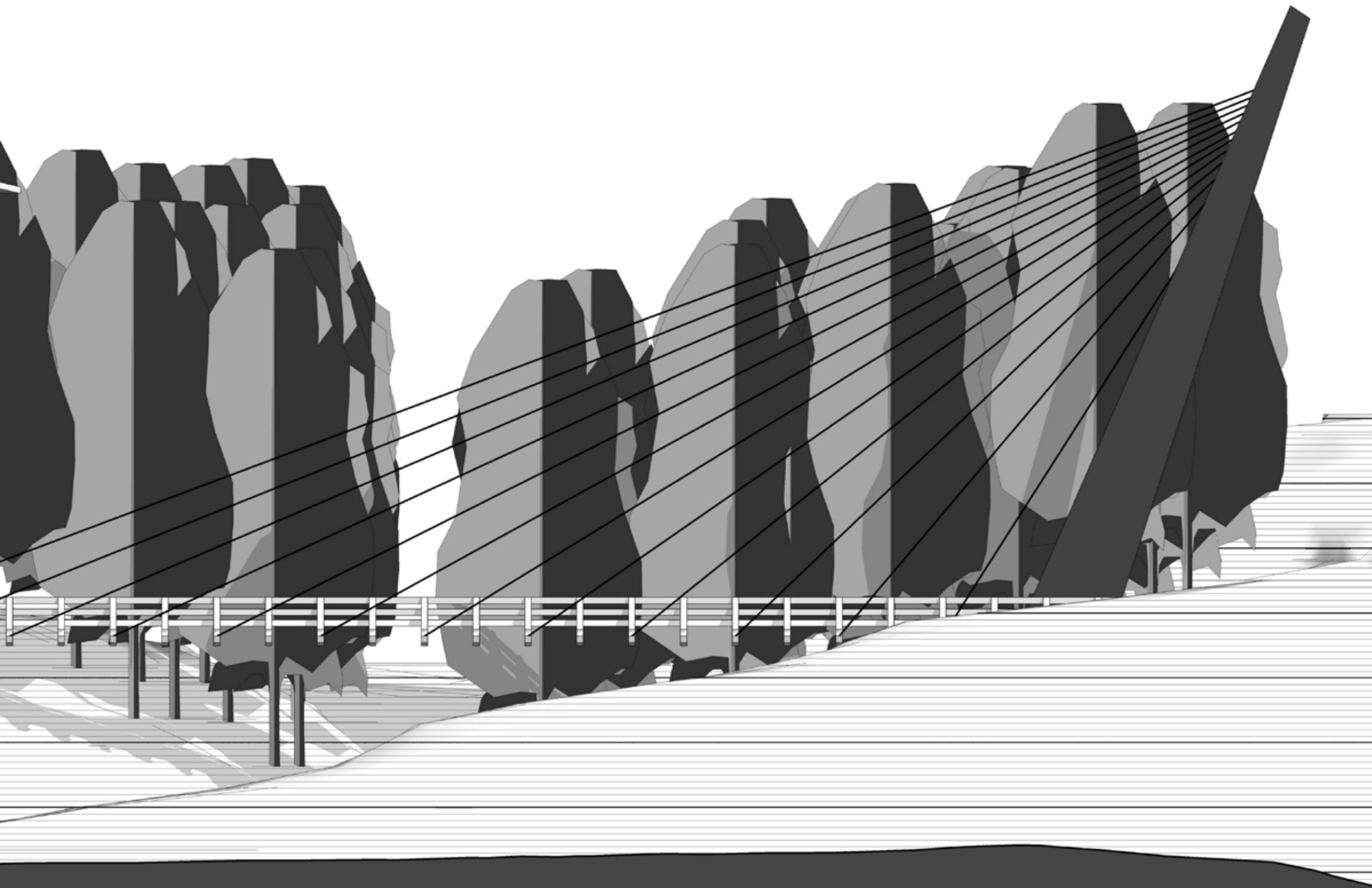
Floor Plan - Mount Level +3



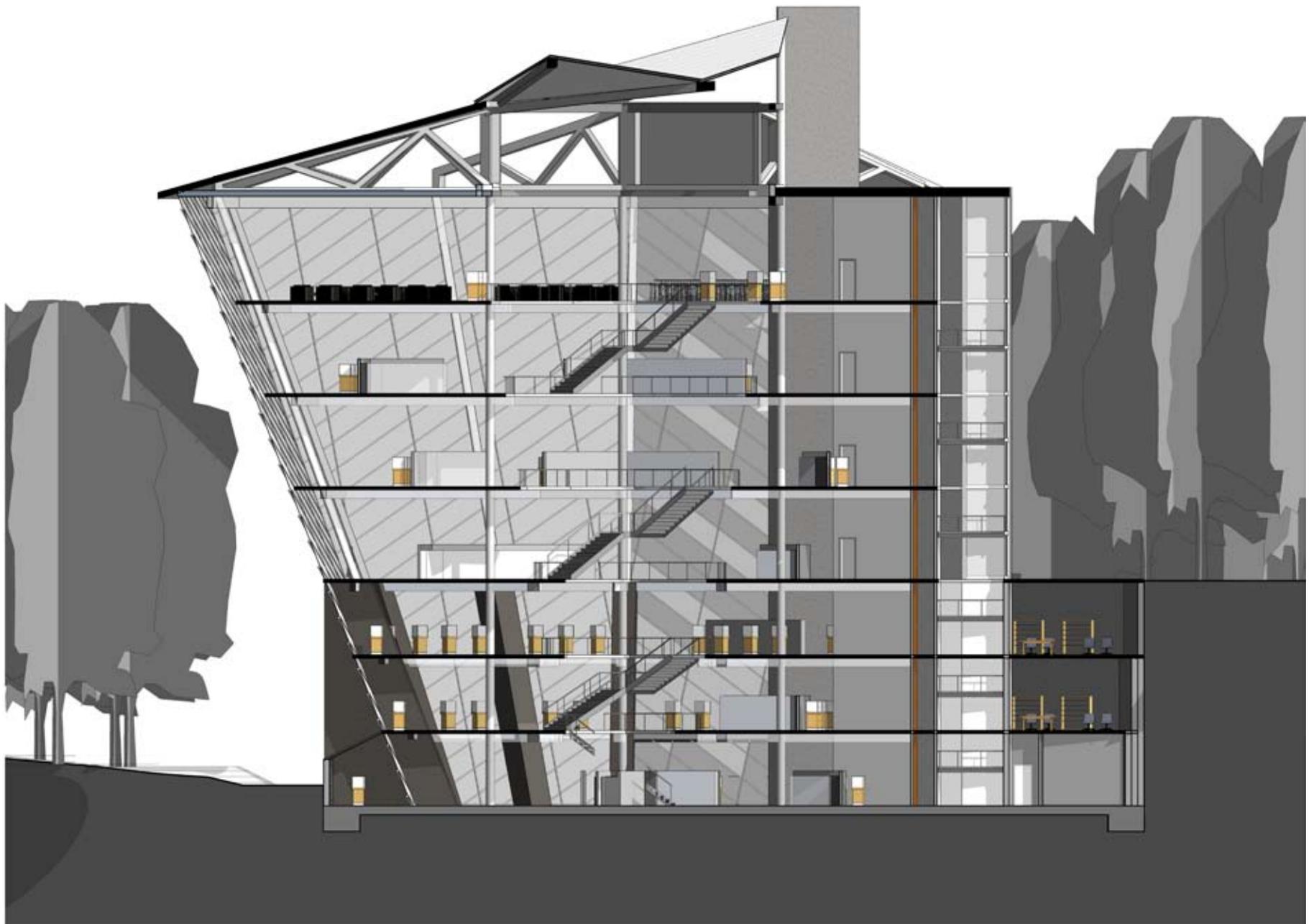


1" = 16'-0"

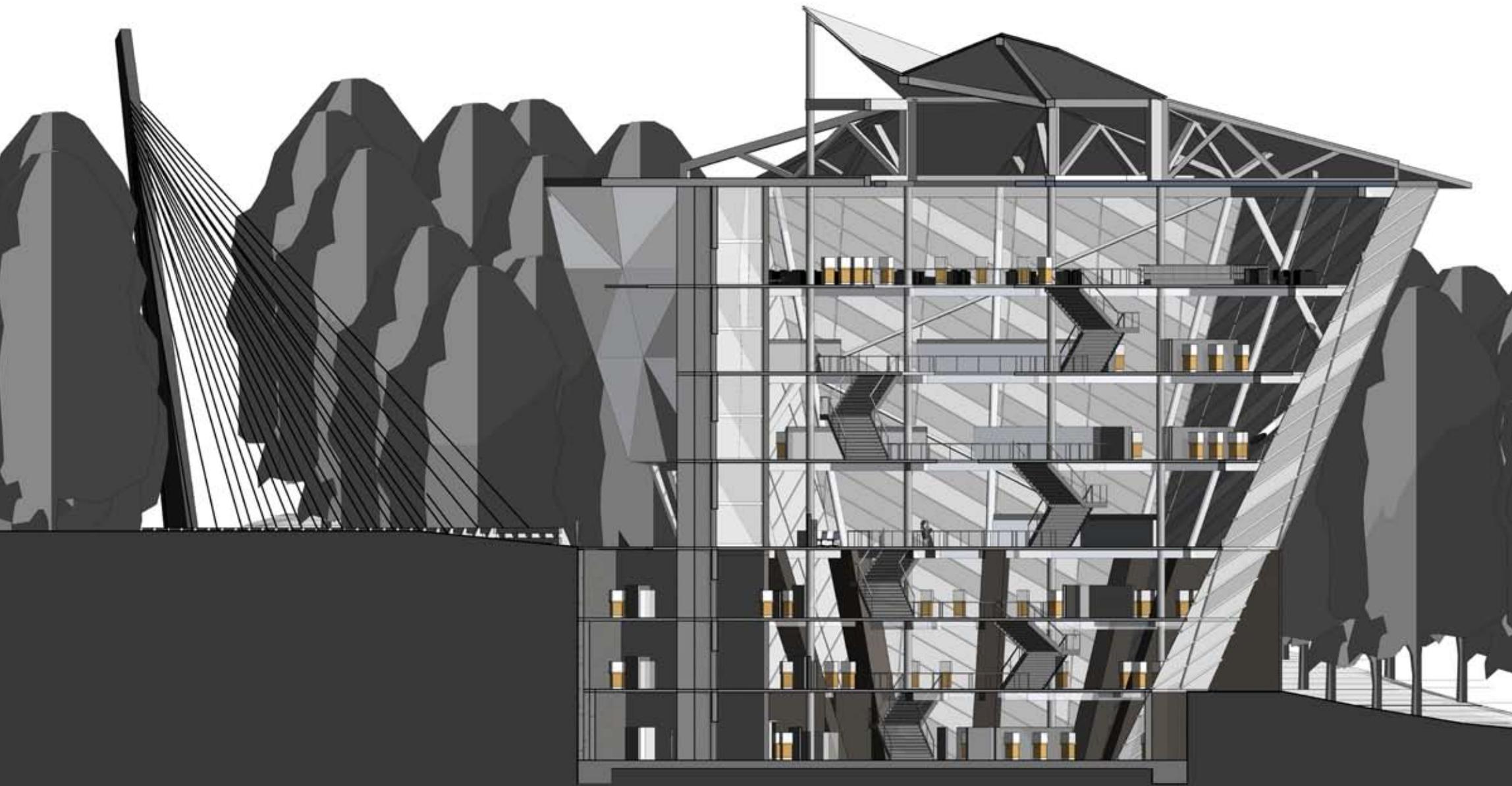




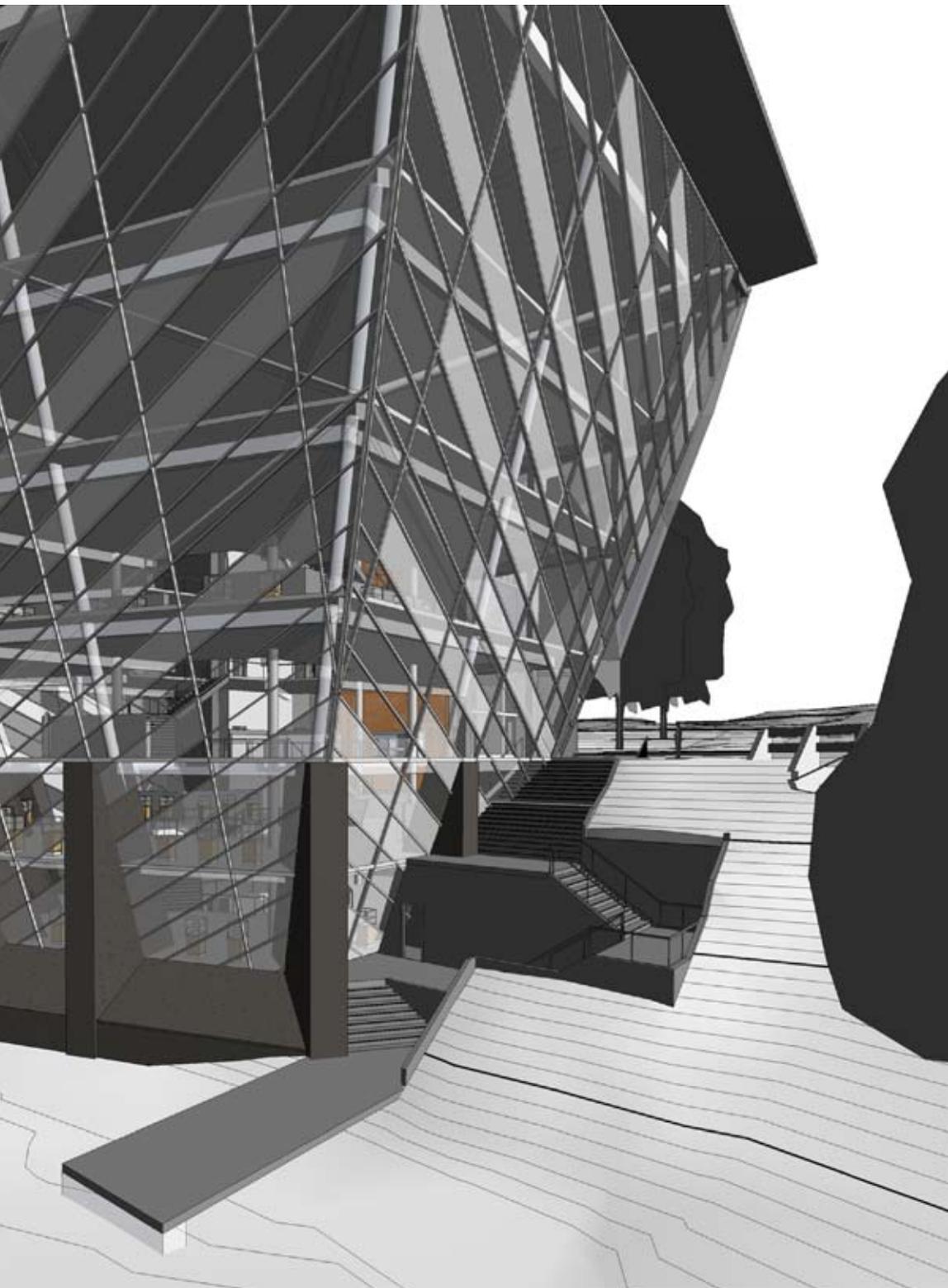
1" = 16'-0"



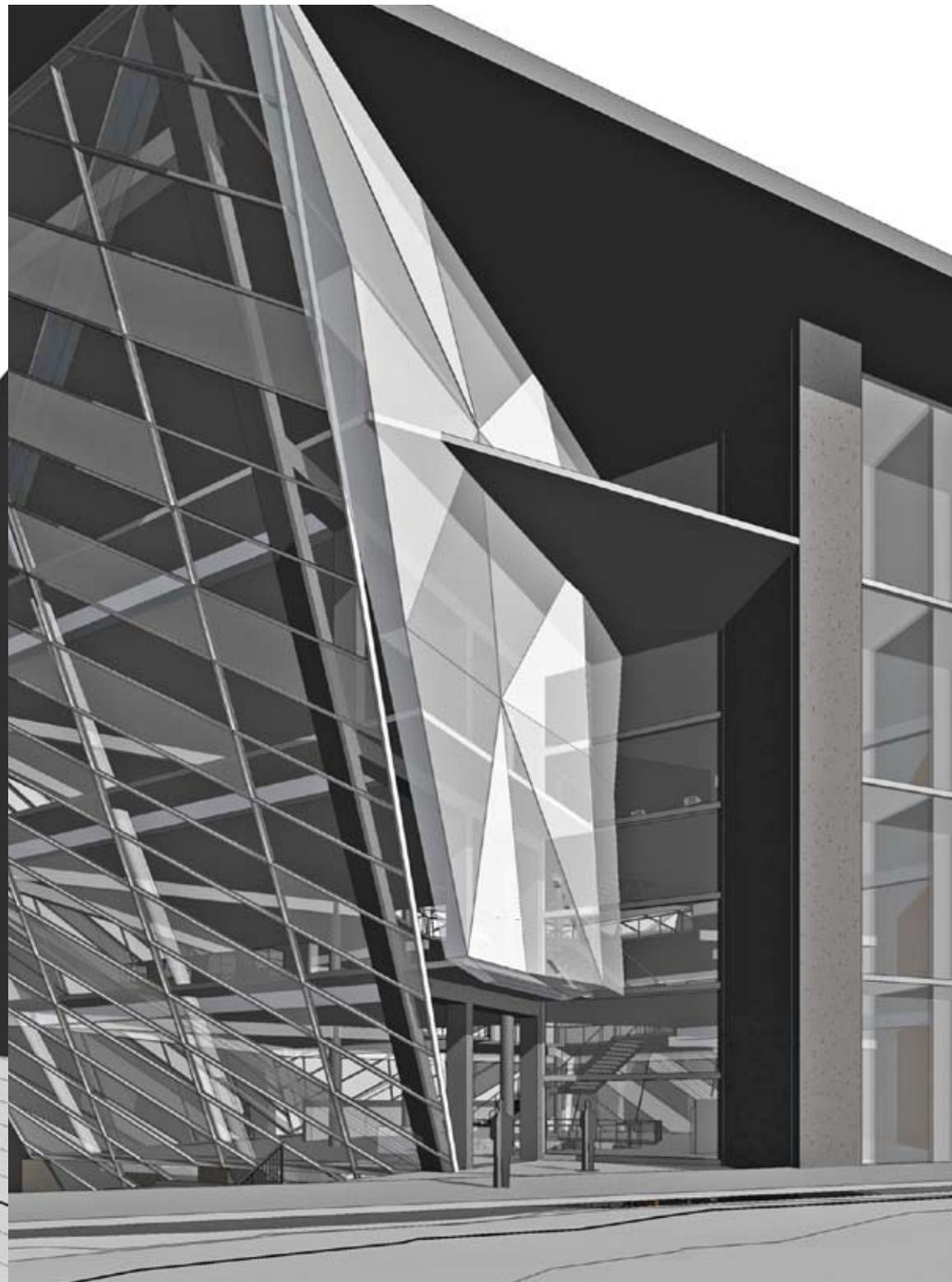
East- West Section Looking South



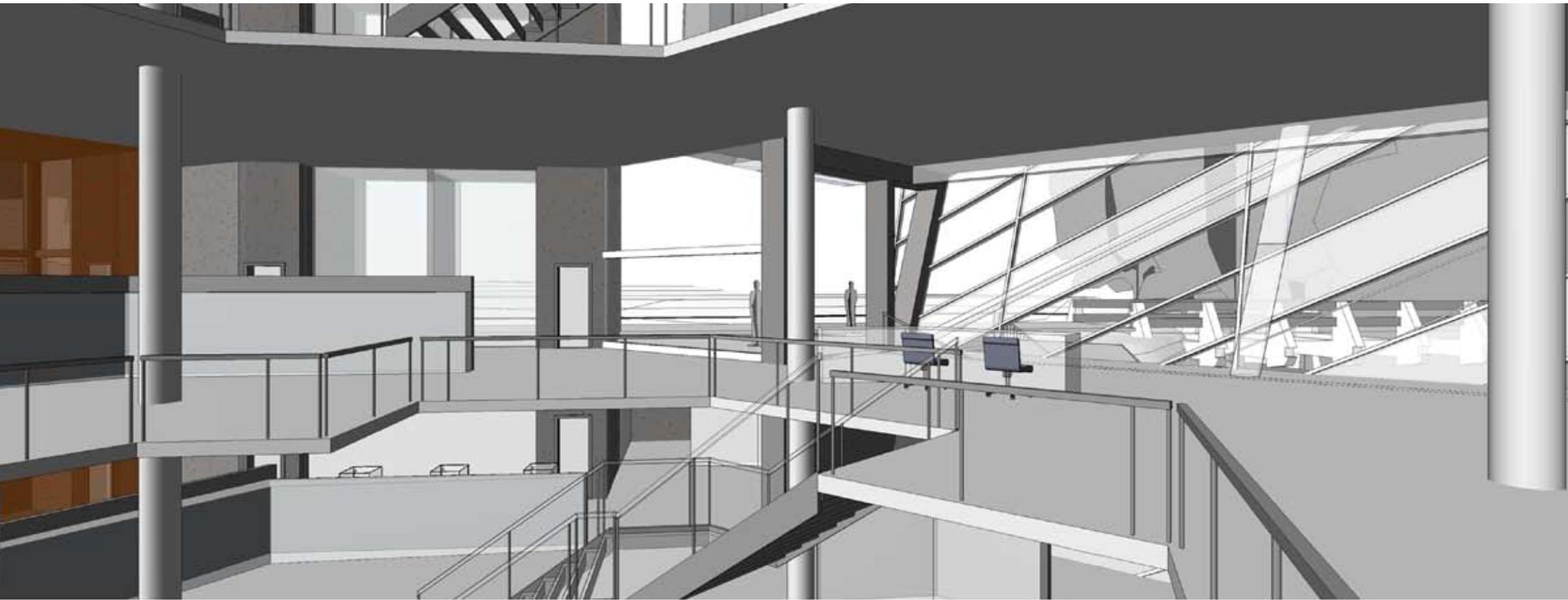
North- South Section looking East



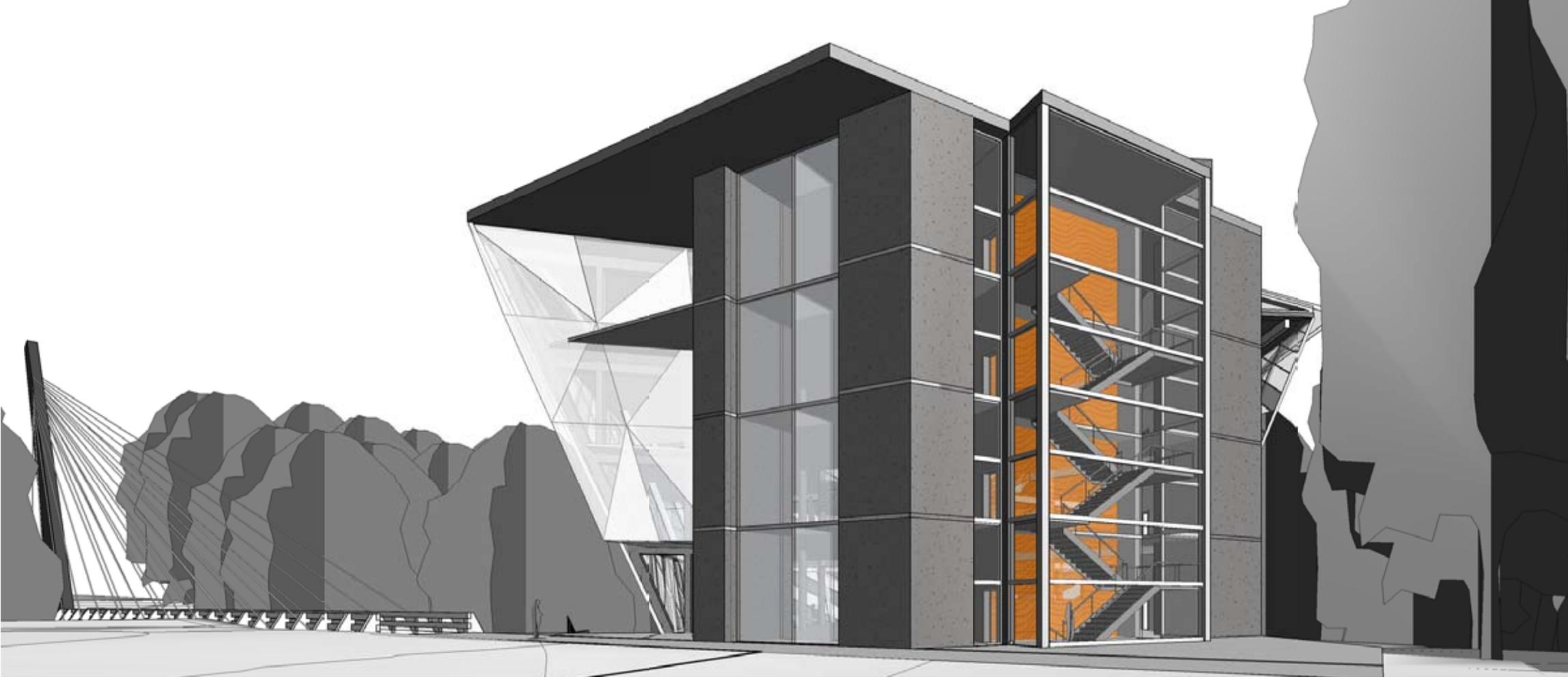
Exterior Perspectives - Site Stair



Exterior Perspectives - Muesum Entry



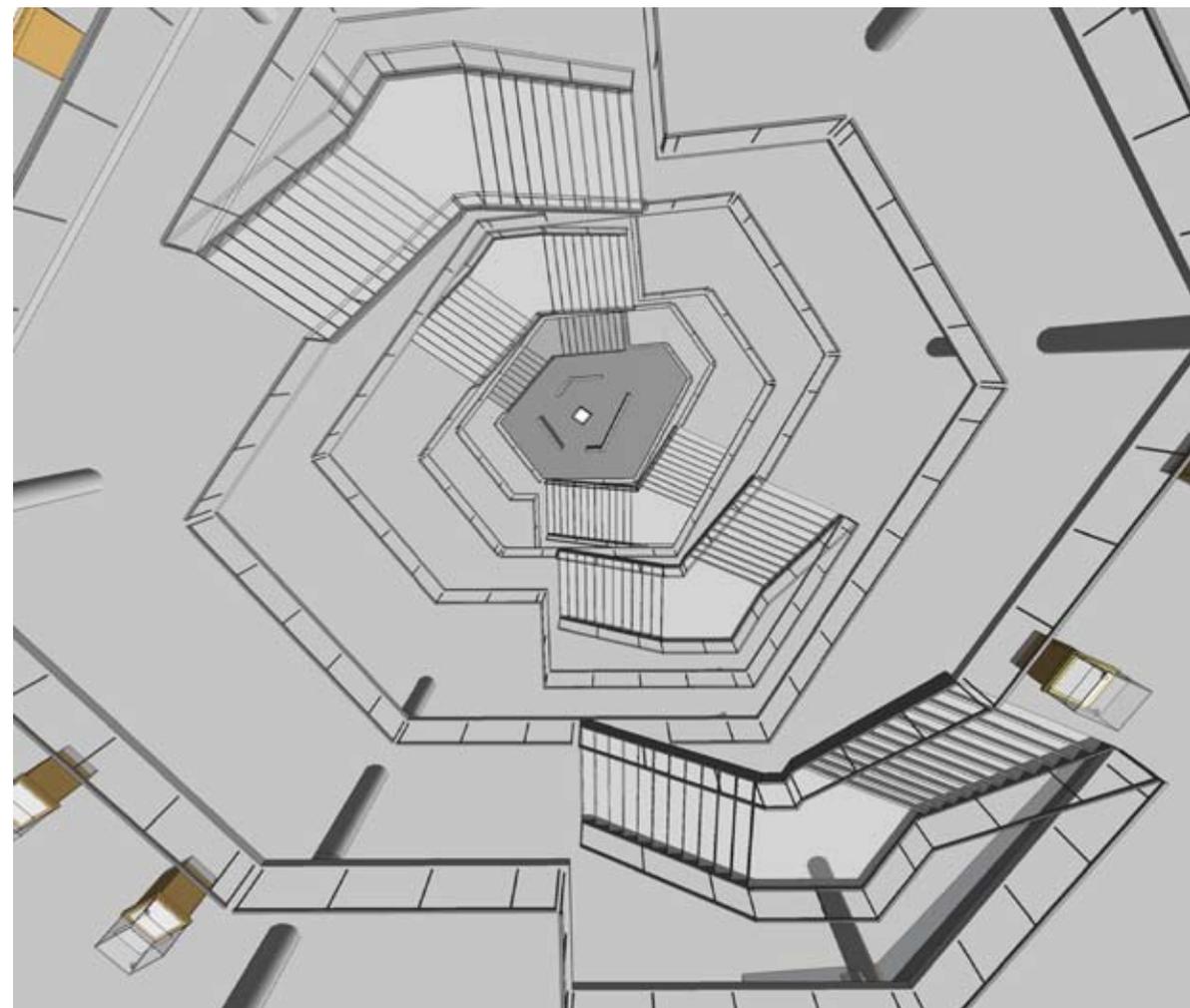
Interior Perspectives



Exterior Perspective - Approach from Rock Creek Drive - Looking at display case of stairs



Interior Perspective



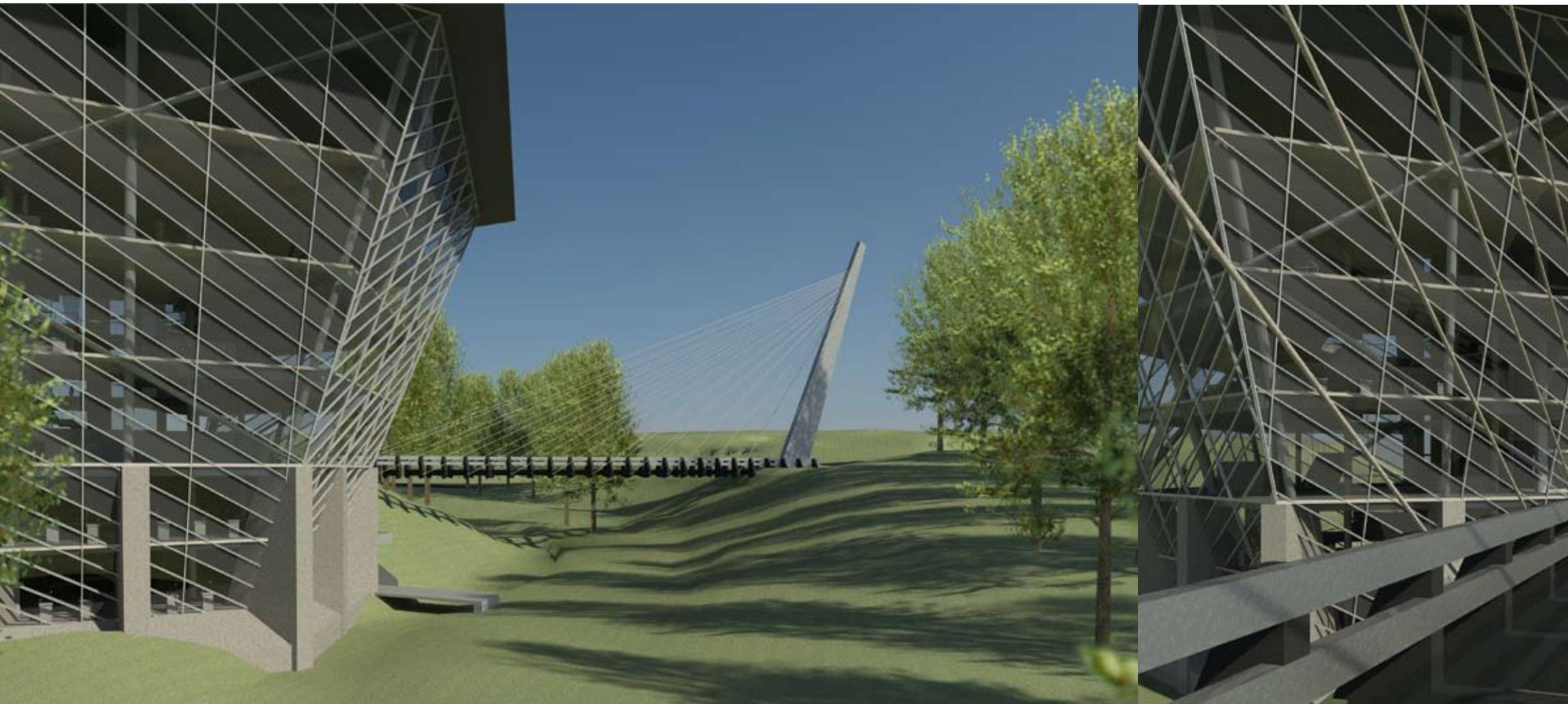
Interior Perspective - Looking down central atrium



Exterior Perspective - Approach from Rock Creek Drive

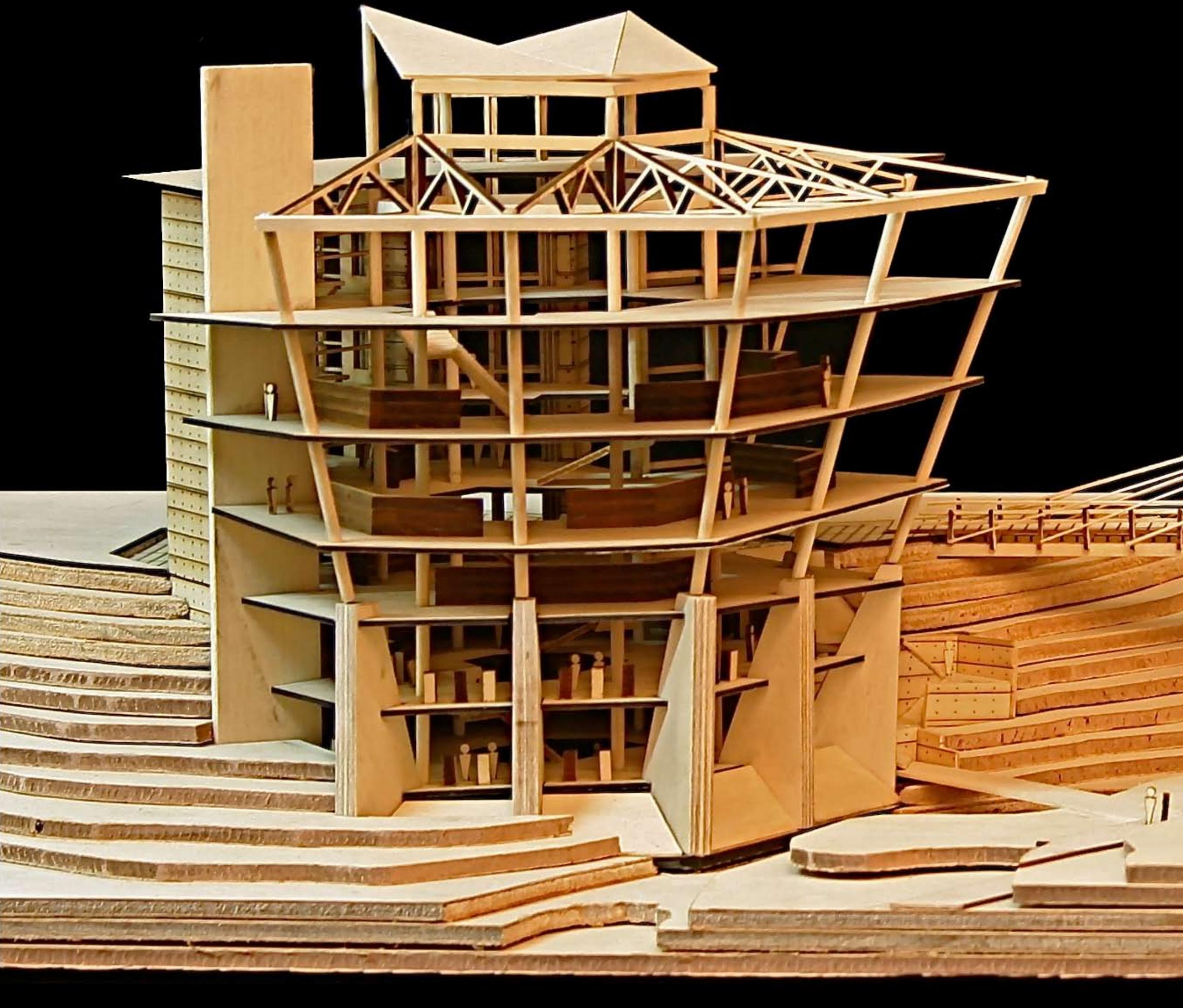


Interior Perspective - Triangular and Square Display Cases

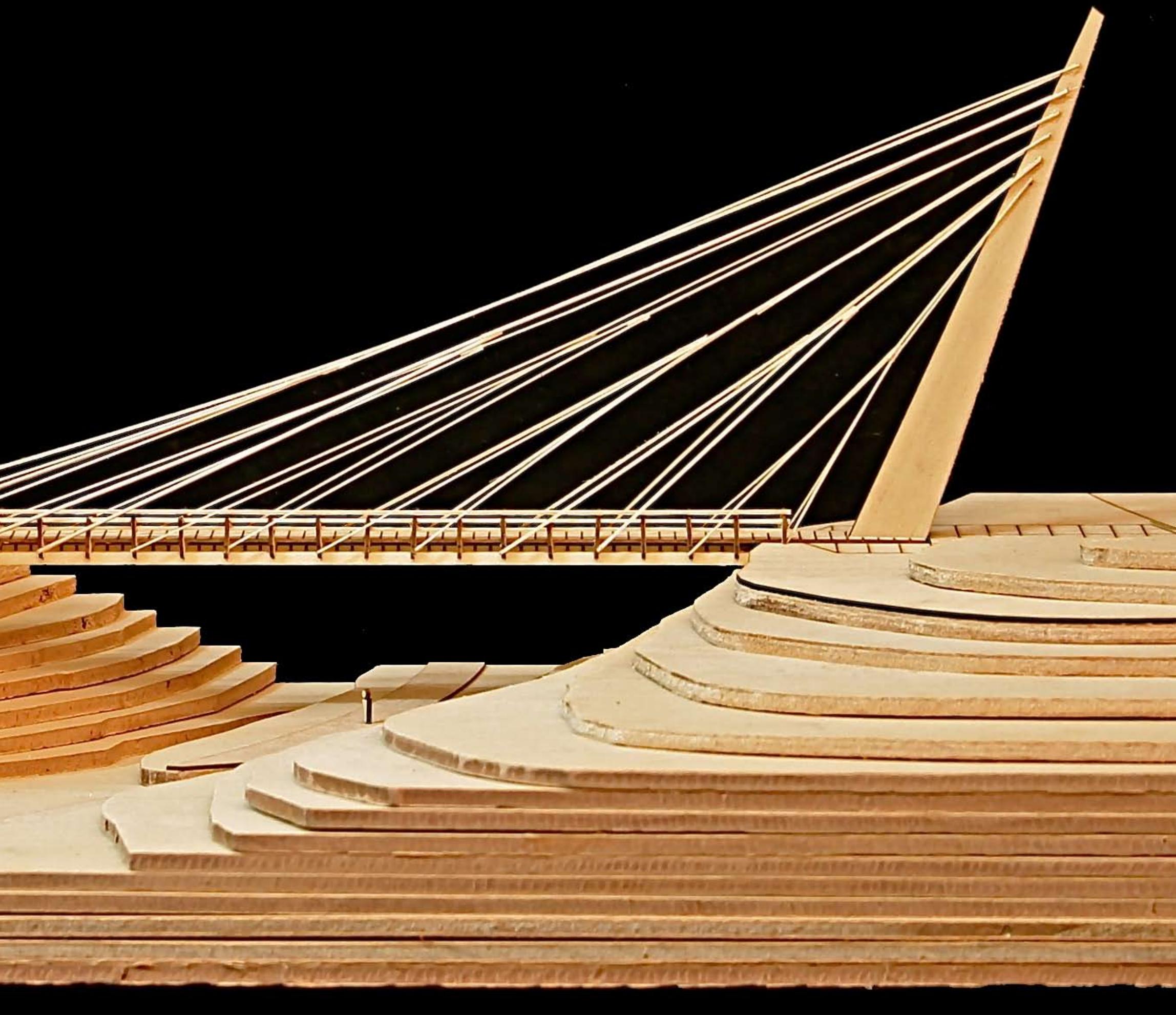


3D Renderings





74 Final Design - Physical Model





bibliography

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All images, sketches and illustrations created by the author unless otherwise noted.

